# *Archives of*
# PHYSICAL MEDICINE

*Official Journal American Congress of Physical Medicine*

(Formerly Archives of Physical Therapy)





**29th Annual Session**

**AMERICAN CONGRESS OF PHYSICAL MEDICINE**

SHIRLEY-SAVOY HOTEL DENVER, COLORADO

VOLUME XXXI OCTOBER, 1950 No. 10

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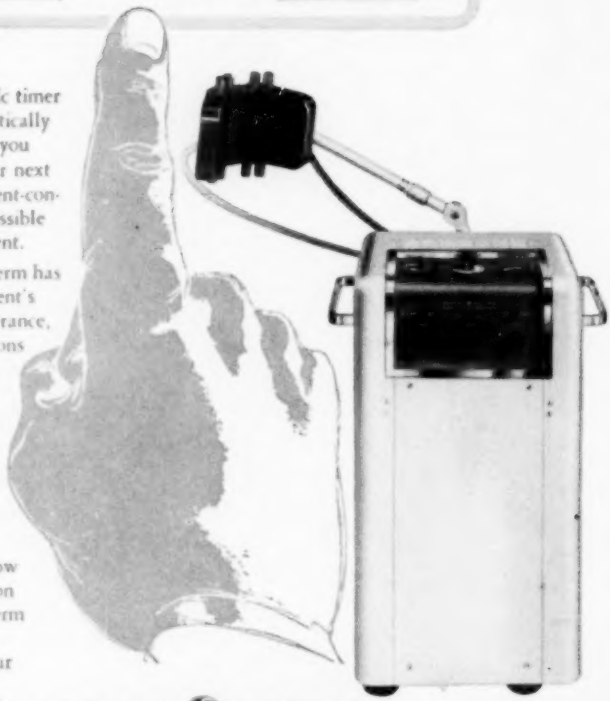

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# Contents—Oct. 1950

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ORIGINAL ARTICLES



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EDITOR OF THE MONTH

**RICHARD KOVACS, M.D.**
New York, N. Y.

Printed in U.S.A.

# APPROVED SCHOOLS FOR PHYSICAL THERAPISTS *

Council on Medical Education and Hospitals of the American Medical Association

| Name and Location of School | Medical Director and Technical Director | Entrance Requirements ** | Duration of Course | Time of Admission | Maximum Enrollment | Tuition | Certificate, Diploma, Degree |
|---|---|---|---|---|---|---|---|
| Childrens Hospital, Los Angeles[1] | S. S. Mathews, M.D.<br>Mrs. Sarah S. Rogers | a-b-d | 18 mos. | Sept | 16 | $300 | Cert. or Degree |
| College of Medical Evangelists, Los Angeles[1] | Fred B. Moor, M.D.<br>R. William Berdan | a-b-c | 18 mos. | Sept | 16 | $300 | Cert. or Dipl. |
| University of Southern California, Los Angeles[1, 13] | Charles L. Lowman, M.D. | a-b-e | 16 mos. | Sept | 20 | $594 | Certificate |
| University of California Hospital, San Francisco[1] | Miss Charlotte W. Anderson | c-d-HS | 1-4 yrs. | Sept/Feb | | $14 per unit | Cert. & Degree |
| Stanford University, Stanford University, Calif.[1] | Lucile M. Eising, M.D.<br>Mrs. Margery L. Wagner | d | 12 mos. | Sept | 18 | $220[3] | Cert. or Degree |
| University of Colorado Medical Center, Denver[1] | W. H. Northway, M.D.<br>Miss Lucille Daniels | a-b-d | 12 mos. | Varies | 18 | $220 | Cert. or Degree |
| Northwestern University Medical School, Chicago | Harold Dinken, M.D.<br>Miss Mary Lawrence | a-b-d | 12 mos. | Sept | 13 | $300[3] | Cert. or Degree |
| State University of Iowa Medical School, Iowa City[1] | Emil D. W. Hauser, M.D.<br>Miss Gertrude Beard | a-b-d | 12 mos. | Oct | 10 | $400 | Certificate |
| University of Kansas School of Medicine, Kansas City[1] | W. D. Paul, M.D.<br>Mrs. Olive Farr | e | 12 mos. | Sept | 10 | $200 | Certificate |
| Boué-Boston School of Physical Education, Medford, Mass. | Donald L. Rose, M.D.<br>Mrs. Ruth G. Monteith | a-b-d | 12 mos. | Feb/Sept | 16 | $ 80[4] | Cert. or Degree |
| Simmons College, Boston | Howard Moore, M.D.<br>Miss Constance Greene | H.S. | 4 yrs. | Sept | 18 | $550 | Dipl. & Degree |
| Boston University College of Physical Education for Women, Sargent College, Cambridge, Mass. | W. T. Green, M.D.<br>Miss Janet B. Merrill | H.S.-e | 1½-4½ yrs. | Sept | 26 | $550 | Dipl. or Degree |
| University of Minnesota, Minneapolis[1] | Kenneth Christophe, M.D.<br>Miss Adelaide McGarrett | H.S.-e-d | 1-4 yrs. | Sept | 30 | $450 | Cert. or Degree |
| Mayo Clinic, Rochester, Minn.[1] | M. E. Knapp, M.D.<br>Miss Ruby M. Green | H.S. | 4 yrs. | Sept | 10 | $1,200[3] | Degree |
| Washington Univ. School of Medicine[2] | Earl C. Elkins, M.D.<br>Harry Keown | a-e | 12 mos. | Sept | 30 | None | Certificate |
| St. Louis University School of Nursing, St. Louis[1] | Sedgwick Mead, M.D.<br>Miss Beatrice Schulz | c | 7 yrs. | Sept | 12 | $775[16] | Degree |
| Albany Hospital, Albany, N. Y. | A. J. Kotkis, M.D.<br>Sister Mary Imelda | H.S. | 4 yrs. | Jan/Sept | 10 | $300 | Degree |
| Columbia University College of Physicians and Surgeons, New York City[1]<br>New York University School of Education, New York City[1] | I. W. Ghormley, M.D.<br>Miss Catherine Graham | a-b-d | 12 mos. | Sept | 6 | $250 | Certificate |
| | William B. Snow, M.D.<br>Miss Floy Pinkerton | a-c-e | 1-2 yrs. | Sept | 50 | $710 | Cert. or Degree |
| Duke Hospital, Durham, N. C.[1] | George G. Deaver, M.D.<br>Miss Elizabeth Addoms | a[1]-b-d | 12 mos. | Sept | 40 | $600 | Cert. & Degree |
| D. T. Watson School of Physiatrics, Leetsdale, Pa.[1] | Lenox D. Baker, M.D.<br>Miss Helen Kaiser | a-b-d | 15 mos. | Oct | 12 | $350 | Certificate |
| Graduate Hospital of the University of Pennsylvania, Philadelphia[1] | Jessie Wright, M.D.<br>Miss Kathryn Kelley | a-b-d | 12 mos. | Oct | 30 | $300 | Diploma |
| University of Texas School of Medicine, Galveston[1] | George M. Piersol, M.D.<br>Miss Dorothy Baethke | a-b-d | 12 mos. | Sept | 20 | $400 | Certificate |
| Hermann Hospital, Houston[1] | G. W. N. Eggers, M.D.<br>Miss Ruby Decker | b-d | 12 mos. | Jan | 8 | $163[3] | Certificate |
| Baruch Center of Physical Medicine of the Medical College of Virginia, in affiliation with Richmond Professional Institute, Richmond[1] | Oscar O. Selke, Jr., M.D.<br>Mary Elizabeth Kolb | a-b-d | 12 mos. | Oct | 12 | $300 | Cert. or Degree |
| University of Wisconsin Medical School, Madison | Walter J. Lee, M.D.<br>Miss Susanne Hirt | H.S.-a-b-c-d-e | 1-4 yrs. | Sept | 14 | $275[3] | Dipl. or Degree |
| Medical Department — U. S. Army — Medical Field Service School, Brooke Army Medical Center, San Antonio, Texas, and Fitzsimons Army Hospital, Denver, Colorado<br>or<br>Walter Reed Army Hospital, Army Medical Center, Washington, D. C. | Harry Bouman, M.D.<br>Miss Margaret A. Kohli | a-b-c<br>H.S. | 12 mos.<br>4 yrs. | Feb/Sept<br>Sept | 20<br>20 | $120[5]/yr<br>$120[5]/yr | Certificate<br>Cert. & Degree |
| Permanente School of Physical Therapy, Oakland, Calif. | James E. Tate, Lt. Col., M.C.<br>Agnes P. Snyder, Major, WMSC | h | 12[13] | Nov. | 20 | None | See Below |
| Cleveland Clinic Hospital, Cleveland, Ohio | Harold B. Luscombe, Col., M.C.<br>Olena M. Cole, Capt., WMSC | Completion MFSS | 12[13] | June | 10 | None | Certificate |
| | John H. Kuitert, Colonel, M.C.<br>Barbara Robertson, Capt., WMSC | Completion MFSS | 12[13] | June | 10 | None | Certificate |
| | O. Leonard Huddleston, M.D.<br>Miss Dorothy Hoag | a-b-d | 12 mos. | July | 20 | $200 | Certificate |
| | Shelby G. Gamble, M.D.<br>Miss Mildred Heap | a-b-d | 12 mos. | Oct. | 12 | $200 | Diploma |

** Courses are so arranged that any of the entrance requirements will qualify students for training. a — Graduation from accredited school of nursing; b — Graduation from accredited school of physical education; c — Two years of college with science courses; d — Three years of college with science courses; e — Four years of college with science courses. H.S. — High school graduation. h — Baccalaureate degree with major in physical education or the biological sciences.

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1. Male students are admitted.
2. B.S. plus one year college.
3. Nonresidents charged additional fee.
13. 12 months includes training at the Medical Field Service School and Fitzsimons or Walter Reed General Hospitals.
14. Students may transfer into the degree course at the Freshman, Sophomore, Junior or Senior Level. All are held responsible for requirements as listed in curriculum outline. This refers to professional as well as nonprofessional courses.
15. First year—$450. Second year—$325.

# APPROVED SCHOOLS FOR OCCUPATIONAL THERAPISTS

## Council on Medical Education and Hospitals of the American Medical Association

NOTE: The duration of the course is expressed in academic years.

| Name and Location of School | College Affiliation | Duration of Course | Classes Start | Entrance Requirements | Tuition Per Year | Certificate, Diploma | Graduates in 1947 |
|---|---|---|---|---|---|---|---|
| University of Southern California, 923½ 35th Place, Los Angeles | University of Southern California | 2 yrs. | FebSept | Degree | $420 | Certificate | 22 |
| | | 5 yrs. | FebSept | High sch. | $450 | Cert.&B.S. | |
| Mills College, Oakland, Calif. | Mills College | 3 yrs. | FebSept | Degree | $200 | Certificate | — |
| | | | | | $550 | | |
| San Jose State College, San Jose, Calif. | San Jose State College | 1½ yrs. | Varies | Degree | $ 21 | Certificate | 10 |
| | | 3¼ yrs. | Varies | High sch. | $ 21 | Degree | |
| University of Illinois College of Medicine, 1853 W. Polk St., Chicago | University of Illinois | 5 yrs. | Feb | High sch. | $152 | B.S. | 14 |
| University of Iowa, Iowa City, Iowa | State University of Iowa, College of Medicine | 5 yrs. | ..... | High sch. | $ 85 | Cert.&Deg. | |
| University of Kansas, Lawrence | University of Kansas | 2 yrs. | FebSept | Degree | $131 | Certificate | 10 |
| | | 4 yrs. | FebSept | High sch. | $131 | B.S. | |
| Boston School of Occupational Therapy, 7 Harcourt St., Boston | Tufts College | 2 yrs. | Sept | Degree | $500 | Diploma | 13 |
| | | 5 yrs. | Sept | High sch. | $450 | B.S. | |
| Wayne University, 4841 Cass, Detroit, Mich. | Wayne University, College of Med., Coll. of Liberal Arts, Coll. of Education | 5 yrs. | ..... | High sch. | ..... | ..... | |
| Kalamazoo School of Occupational Therapy, Western Michigan College of Education, Kalamazoo | Western Michigan College of Education | 1½ yrs. | FebSept | Degree | $127 | Diploma | 20 |
| | | 4 yrs. | FebSept | 1 yr. coll. | $127 | Degree | |
| Michigan State Normal College, Ypsilanti | University of Michigan | 5 yrs. | Varies | High sch. | $118 | Cert.&Deg. | 8 |
| University of Minnesota, Church Street, Minneapolis | University of Minnesota | 4 yrs. | ..... | High sch. | $360 | B.S. | |
| College of St. Catherine, St. Paul, Minn. | The College of St. Catherine | 3½ yrs. | Varies | 1 yr. coll. | $210 | Degree | 4 |
| Washington University School of Medicine, St. Louis | Washington University | 3 yrs. | Sept | 2 yrs. coll. | $400 | Degree | 10 |
| University of New Hampshire, Durham | Univ. of New Hampshire | 5 yrs. | Sept | High sch. | $160 | Cert.&Deg. | 6 |
| Columbia University College of Physicians and Surgeons, 630 W. 168th St., New York City | Columbia University | 1½ yrs. | Sept | Degree | $450 | Certificate | 28 |
| | | 2½ yrs. | Sept | 2 yrs. coll. | $450 | Degree | |
| New York University School of Education, 100 Washington Sq. E., New York City | New York University | 4½ yrs. | FebSept | High sch. | $500 | Cert.&Deg. | 20 |
| Ohio State University, Columbus | Ohio State University | 3 yrs. | Quarterly | High sch. | $105 | Degree | 21 |
| Philadelphia School of Occupational Therapy, 419 S. 19th St., Philadelphia | University of Pennsylvania | 1½ yrs. | Sept | Degree | $500 | Diploma | 35 |
| | | 3 yrs. | Sept | 1 yr. coll. | $500 | Diploma | |
| | | ..... | ..... | High sch. | $600 | ..... | |
| Texas State College for Women, Denton, Tex. | Texas State College for Women | 5 yrs. | FebSept | High sch. | $150 | Degree | 13 |
| Richmond Professional Institute, 901 W. Franklin St., Richmond, Va. | Medical College of Virginia | 1½ yrs. | Sept | Degree | $200 | Certificate | 20 |
| | | 3 yrs. | Sept | 1 yr. coll. | $200 | Certificate | |
| College of Puget Sound, Tacoma, Wash. | College of Puget Sound | 3 yrs. | FebSept | Degree | $350 | Certificate | |
| | | 5 yrs. | FebSept | High sch. | $300 | Cert.&Deg. | |
| University of Wisconsin, Madison | University of Wisconsin | 4 yrs. | FebSept | High sch. | $320 | Cert.&Deg. | 8 |
| Milwaukee-Downer College, Dept. of Occupational Therapy, 2512 E. Hartford, Milwaukee | Milwaukee-Downer College | 2½ yrs. | Sept | 1 yr. coll. | $300 | Diploma | 22 |
| | | 4 yrs. | Sept | High sch. | $300 | Dipl.&Deg. | |
| Mount Mary College, 2900 Menomonee River Dr., Milwaukee | | Varies | Sept | Degree | $335 | Certificate | 15 |
| University of Toronto, Dept. of University Extension, Toronto, Ont., Canada | University of Toronto | 5 yrs. | Sept | High sch. | $260 | B.S.Deg. | |
| | | 3 yrs. | Sept | 1 yr. coll. | $222 | Diploma | 110 |
| Colorado Agricultural and Mechanical College, Fort Collins, Colorado | | 5 yrs. | Sept | High sch. | ..... | B.S. | |

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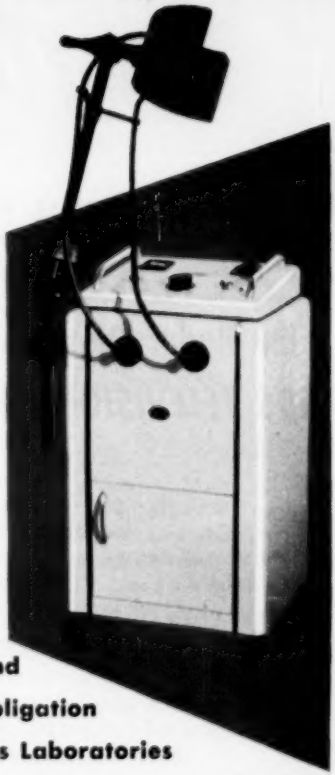

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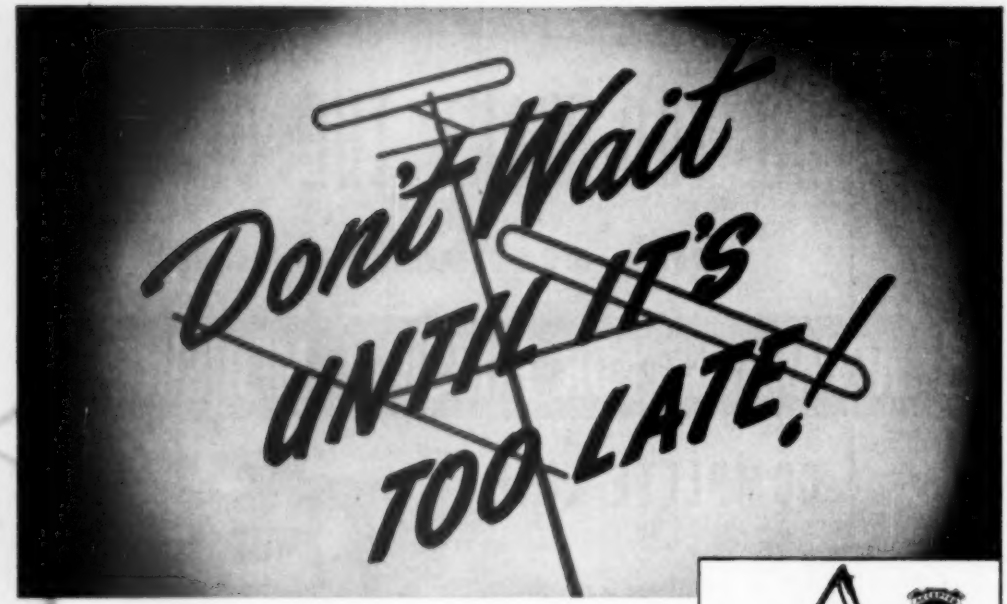


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# BOUNDARIES OF PHYSICAL MEDICINE *

ARTHUR L. WATKINS, M.D.

Assistant Clinical Professor of Medicine, Harvard Medical School;

Chief of Physical Medicine, Massachusetts General Hospital,

BOSTON

The first duty of your incoming President is to address you, if possible, with some words of wisdom or inspiration. At this midpoint in the century, it is perhaps appropriate to review our past and try to determine in what direction our future road lies. We have been presented with numerous definitions of physical medicine, and there are even more for rehabilitation, as you all know. The confines of our specialty, however, are still not clear, and, accordingly, I am going to explore with you the boundaries of physical medicine by relating some of the achievements of our previous presidents. To do this, I have arbitrarily chosen the five years before and following office and looked up the medical publications of each president during this period. This sample of their medical writings gives us, perhaps, as objective a picture of their interests and accomplishments in medical spheres as is available to us and will reveal the diverse interests of those in our specialty.

One of the oldest organizations in which we can trace our origin is the American Physical Therapy Association. The first president, in 1890, was Dr. G. Betton Massey. We find that he was interested in the action of the galvanic current. He described the use of absorbent cotton as an electrode covering and other practical devices of a technical nature. He was particularly devoted to the use of electricity in the diseases of women, including the application of, as he said, "strong currents," and published a two hundred and eighteen page monograph on this subject. He wrote six or seven papers each year, frequently emphasizing the treatment of fibroids electrically.

Our second president, William J. Morton (1891), was also keenly interested in electricity, including static. He was not as prolific in his writing as Massay but branched out into the field of legal execution by electricity and raised the question of instantaneous, painless and absolute death by this method.

Next, A. H. Goelet (1892), like Massey, was chiefly concerned with the use of faradic and galvanic currents in diseases of the female pelvis, but he also wrote on electrocution, I presume as a medical authority.

William J. Herdman's writings (1893) showed an interest in neurology as well as gynecology. He deplored, however, the ignorance of the medical profession concerning the fundamental principles of electrotherapeutics, and at an annual meeting of the American Medical Association in the Section on the Practice of Medicine and Physiology in 1891 he said:

> How many physicians who are daily making use of electricity in their practice could explain the construction of the apparatus they are employing or the conditions it must comply with in order to generate a current? I have known a physician in high standing, a professor in a medical college, to use a galvanic battery of simple construction for a period of three months in making daily applications to a patient, and during that entire time there was no current passing through the conducting cords, he having failed to join the proper connections. And such mortifying instances, discreditable to the profession, could be related ad nauseum.[1]

* Presidential Address, read at the Twenty-Eighth Annual Session of the American Medical Association, Boston, Aug. 29, 1950.

1. Herdman, W. J.: Electricity as a Therapeutic Agent: What Is Needed to Determine Its Merits? J. A. M. A. **16**:582 (June 13) 1891.

A. Lapthorn Smith (1894) was another gynecologist interested in the applications of electrical currents but he was, in addition, somewhat of a philosopher, as he wrote a paper entitled "What Civilization is Doing for the Human Female." His interests also extended to the effect of sewer gas on bad results in obstetrics and gynecology. Robert Newman (1895) wrote on electrolysis in the treatment of strictures of the rectum, urethra and eustachian tubes. He also used electricity in the treatment of gout and goiter. His wide medical interests led him to comment on the importance of cremation in cholera.

William T. Bishop (1896) was apparently a busy surgeon with little time to write, although he did comment on interscapulothoracic amputations. Charles R. Dickson (1897) described the use of electrolysis for certain skin tumors as well as first aid instruction for railroad employees. Francis B. Bishop (1898) had an interest in functional disorders of the nervous system and advocated the use of electricity in the treatment of hysterical paralysis and other neuroses.

Our tenth president, Walter H. White (1899), was quite a prolific writer. His subjects included reports of various intracranial disorders, pernicious anemia, dysentery, nephritis, cancer, cirrhosis and tuberculosis. He was also author of a text on materia medica and pharmacology. His relationship to physical medicine is noted by his publications on the regulation of temperature in man and hibernating animals and also his papers on electrical treatment for rectal strictures and constipation.

Ernest Wende (1900) must have been a pediatrician, as he wrote several papers on the dangers of long tube nursing bottles and about various diseases of childhood. He also wrote on electrotherapeutics and proclaimed in 1900 the establishment of the first free public bath house at Buffalo, N. Y.

Frederick H. Morse (1901), although primarily known as an electrotherapist, did write on mechanical vibration as a physical agent in the treatment of disease. D. R. Brower (1902) was a neurologist, who wrote, in addition to a textbook on insanity, a variety of clinical papers on organic diseases of the nervous system, including facial paralysis. Little mention, however, was made of strictly physical medicine treatment. A. R. Rockwell (1903) was another neurologist, but he was greatly intrigued with the uses of electricity and felt that there was an analogy between nervous and electrical conductability which related to functional neuroses. He also wrote a textbook of over 600 pages in 1903 on the medical and surgical uses of electricity, including x-rays, Finsen light, vibratory therapeutics and high frequency currents.

The name of William B. Snow (1905) is doubtless familiar to you all and certainly that of his son who is nobly carrying on the tradition of eminence in physical medicine. His "Manual of Electrostatic Modes of Application, Therapeutics, Radiography and Radiotherapy" is an outstanding historical document in our field. Dr. Snow was also editor of the *Journal of Advanced Therapeutics* which combined with the *New York Lancet* in 1902 and contained in large part the contributions of the members of our specialty.

M. W. Brinkman (1906) was much concerned with the effect of electrical energy on different parts of the body and suspected selective effects from electrical harmonic vibration. Herbert F. Pitcher's (1907) only publication was that of phototherapy in general practice. Edward C. Titus (1908), in addition to papers showing the value of static wave for dysmenorrhea, wrote on the relative action of x-ray and light upon enzymes and their therapeutic significance. Thomas D. Crothers (1909), our twentieth president, was very

verbose, writing on the effects of drugs such as alcohol and morphine. He looked up the incidence of inebriety in ancient Egypt, commented on the ill effects of alcohol on the teeth, jaws, upper air passage and indicated it to be a cause of autointoxication. He felt that "inebriety should be taught in medical colleges" but did speak of alcohol as a remedy. He also advocated the radiant light bath for treatment of nervous diseases.

Frederick deKraft (1910) described his observations on the Oudin current and, like William D. McFee (1911), his successor, was interested primarily in electrotherapy. Dr. McFee at an early date promoted the term "physical medicine" and published Granger's text on "Physical Therapeutic Technic" in 1929. He was also a politician and served as Mayor of the City of Haverhill, Mass. F. H. Humphris (1912) was known for his use of electrical stimulation in the treatment of a variety of conditions. His prescribed treatment for obesity is perhaps of some interest. He placed the nude patient in a metal chair, which acted as the indifferent electrode, and had twelve active electrodes connected with a faradic coil with a total area of 10,000 cc. of contact over muscles. Stimulating surges were given at a rate of 100 per minute for twenty-five minutes daily, the contractions being strong enough to move sacks as great as 200 pounds, which were occasionally used to hold the electrodes in place. He reported weight losses of 20 to 40 pounds in six weeks, the object being to exercise without fatigue.

George E. Pfahler (1913) was fundamentally a radiologist. He explained the x-ray diagnoses of diseases of the intestinal tract, kidneys, bones and joints, as well as x-ray treatment for malignant diseases. His publications included a device for interrupting the static wave current with a pendulum and the use of high frequency currents in rheumatoid arthritis. John W. Torbett (1914) described several types of physical treatment, including hydrotherapy, the use of the continuous current in chronic disease and x-ray treatment of leukemia. Jefferson D. Gibson (1915) was somewhat of an expert on tuberculosis and described a method of treatment of "natural elements in tuberculosis until they become therapeutic agents by means of x-rays."

J. Willard Travell in 1916 had a typical title for his presidential address, "Electricity Then and Now." Frank B. Granger (1917), who is known to you because of his development of physical therapy at the time of the first World War, wrote primarily, however, on the subject of electrotherapy. William L. Clark (1918) was also chiefly concerned with electrotherapy but from the surgical aspect as in the treatment of malignant disease, hemorrhoids and tumors of the skin.

William Martin (1919), the thirtieth president, was one of the most prolific authors, as can be judged from the variety of subjects on which he wrote, which included foreign bodies, flat feet, hemiplegia, neuritis, melancholia, tuberculosis, flatulence, hairball, jaundice, osteomyelitis, facial paralysis, fractures and ectopic gestation. Among his titles we find: "Is There Any Value in Electrotherapeutics?" the answer obviously being, Yes. Byron S. Price (1920) was interested in thermotherapy and hydrotherapy in vascular disease and the elimination of waste products by electrotherapy. Virgil C. Kinney (1921), although only writing four articles, included a dissertation on salt glow massage and spray and one on low candle power light.

Frank B. Peckham (1922), who was also president of the Rhode Island Medical Society, was the first orthopedic surgeon in our midst. His publications were chiefly on bone and joint diseases, as might be expected. Sinclair Tousey (1923) was an x-ray man who was also attracted by the thera-

peutic uses of electricity and ultraviolet rays. William T. Johnson (1924) explored the physiologic response of radiant energy and other physical agents but had a particular interest in the after-care of fractures.

A urologist, Victor C. Pedersen (1925), was the next to take office and described the use of diathermy in prostatic conditions among several other papers on urology. Curran Pope (1926) showed a keen appreciation of hydrotherapy, writing a number of papers on the subject, and was an ardent advocate of the whirlpool bath. The applications of physics in medicine interested Charles F. Stokes (1927), who gave us some detailed papers on black body radiation. Burton B. Grover (1928) wrote several times on autocondensation, but the paper that attracted me most was the one entitled, "We: Electric Expeditionary Forces."

The fortieth president, Arthur L. Brown (1929) was unique in being the first president to come from the small town of Winchester, Mass., the second being myself. He was a general surgeon who was interested in the value of physical therapy and tried to further the education of his fellow physicians in it. A. David Willmoth (1930) was another surgeon who was attracted to physical medicine through the use of surgical diathermy. Edwin N. Kime's (1931) interest was initiated by electrosurgery, but he also concerned himself with ultraviolet radiation and advocated physical therapeutics as a specialty in medical practice in his presidential address.

George J. Ott (1932) specialized in treatment of diseases of the distal end of the gastrointestinal tract, emphasizing diathermy, static electricity and mechanical vibrations. William H. Schmidt (1933 and 1939) who, I am happy to say, is with us today, was president of both the American Physical Therapy Association and the Congress. He has written about his experiences with electrosurgery, fever therapy and diathermy but is such a successful clinical physiatrist that he has not had time to compile an extended bibliography.

John Severy Hibben (1935) was president when the American Physical Therapy Association became amalgamated with the Congress. In those years, around 1935, he wrote on the physics of radiant energy among other topics. I also remember an especially excellent article of his on legal medicine.

Only two of our presidents, Emil Heuel (1904) and Worthington Seaton Russell (1934) failed to have papers published in the ten year period searched.

If we trace back another root of origin of the Congress, we find that in 1923 the American College of Radiology and Physiotherapy was organized at Omaha, with Samuel B. Childs, as first president, and Roy W. Fouts as secretary. They applied for a Section in the American Medical Association but, although turned down, received favorable mention and encouragement editorially. Dr. Childs, the first president of what is now the Congress, wrote mainly concerning radiology. The second president, Curran Pope, has already been commented upon in relation to his presidency in the Physical Therapy Association.

Our beloved John S. Coulter (1925) was the third president, and I hope it is not necessary to introduce any of you to his important literary contributions. They are too numerous to itemize in any event as, for example, he wrote fourteen papers in one year on various traumatic conditions. He was, I think, the first of our presidents to show the necessity of medical supervision in occupational therapy. Perhaps the "Principles and Practice of Physical Therapy," published in three volumes by Prior, is his best known publication, but you have all benefited by his work on the Editorial Board of the

Archives and with the Council on Physical Medicine and Rehabilitation of the American Medical Association.

Disraeli Kobak (1926), who was for years the editor of the Archives, has an important list of publications particularly in relation to diathermy. James C. Elsom (1927) was the first of our presidents to write repeatedly on therapeutic exercise, which he pointed out was a neglected method in physical therapy. Frank L. Walke (1928) had a variety of interests, including industrial accidents, and wrote frequently on electrotherapy. Norman C. Titus (1929) gave us many papers on the different aspects of diathermy, static and low voltage currents but also wrote on the whirlpool bath and ultraviolet radiation. Roy W. Fout's (1930) publications were for the most part concerned with use of x-ray in diagnosis and treatment.

The late Frank H. Ewerhardt was president in 1931. He had a background in physical education and emphasized the principles of bodily mechanics and the applications of physical therapy in orthopedics. I hope you are all familiar with his excellent book on therapeutic exercises.

He was followed by Gustav Kolischer (1932), who, as a surgeon, wrote primarily on surgical diathermy. Alfred F. Tyler (1933) was another radiologist with an interest in physical therapy.

The next Congress president, William L. Clark (1934), was also president of the American Physical Therapy Association in 1918, as you have heard. William H. Bierman was president in 1936 and, as you know if you are familiar with his numerous publications, is one of the outstanding specialists in our field, who from the beginning has been interested in clinical research. This is emphasized by his careful studies on circulation in relation to fever therapy and diathermy and in peripheral vascular disease. His excellent textbook, I am glad to say, is going into a third edition. Frederick L. Wahrer (1937) was our first ear, eye, nose and throat specialist and appreciated the value of physical agents in treatment of diseases of this part of the body.

The next name I come to is that of Frank H. Krusen (1938), and I must admit I didn't find the time even to list his voluminous bibliography. I should like to point out, however, that as long ago as 1938 he was writing about industrial rehabilitation and rehabilitation of the chronically disabled to show the value of physical medicine. You are all familiar with his excellent textbook and the splendid work being carried out in the laboratories and clinics in Rochester under his direction. The establishment of our specialty board and the permanent section in the American Medical Association is largely due to his efforts.

Nathan Polmer was our president ten years ago. He described the use of physical therapy in the still important subjects of subdeltoid bursitis and treatment of traumatic neuroses. A. R. Hollender (1941) was a prominent otolaryngologist and was a great advocate of the use of various types of electrical treatment in his specialty, as indicated by a textbook on this subject which was published in 1937.

The last seven presidents are probably too well known to you to require any comment on their contributions. For the benefit of some of our younger members, however, I will make a few brief notations.

Fred B. Moor (1942) is co-author of a text on "Physical Therapy in Nursing Care" and has written on diverse subjects in physical therapy as well as serving as one of your editors. Kristian G. Hansson (1943) has written frequently on the use of physical therapy in various orthopedic problems. Miland E. Knapp (1944) is an expert on the use of physical medicine in the treat-

ment of fractures and in the after-care of poliomyelitis. Walter S. McClellan (1946), the medical director of the Saratoga Spa, has given us some important papers on health resorts.

H. Worley Kendell's (1947) interest in research began with his studies on fever therapy and has continued in his department at the University of Illinois. Ora L. Huddleston (1948) is perhaps unique as he entered the field of physical medicine from physiology. Certainly one could hardly choose a better approach, and with this background he has made many contributions of a physiologic nature to strengthen our specialty.

Our last president, Earl C. Elkins, is, I believe, the first to have completed a formal training in physical medicine of a type now recommended by the American Board of Physical Medicine and Rehabilitation. We are fortunate that he has taken such a deep interest in education, and I am sure the time and effort he has spent in this direction will do much to improve courses of instruction for physical and occupational therapy technicians, medical students, residents and graduate physicians.

In looking back over the achievements of our seventy-odd past presidents, one notes that these men were primarily established as good surgeons, neurologists, radiologists or internists who had a pioneering interest in physical medicine. Our ranks also included gynecologists, urologists, otolaryngologists, orthopedists, physiologists and pediatricians. This indicates the broad scope of our specialty which I believe should not be obscured by overemphasis of special technics, although it is, of course, necessary that all worthy to be called physiatrists have a detailed knowledge of physical therapy, electrodiagnostic technics, occupational therapy and medical rehabilitation procedures.

It is true that we are not closely bound together by standardized training and experience and by knowledge beyond that of all others outside our specialty. I do not think we should worry, however, because we find that we do not have exclusive knowledge or even practice in our special spheres. We are still too few in number to carry the complete burden of giving physical medicine to all patients as needed. I also see no harm in a little subspecialization, and, in fact, I advocate it for the younger men in training. We have an ample precedent for special interests beyond pure physical medicine in the records of our past and future presidents. The approved residency training programs indicate in a general way what must be included in our specialty, but we are still free to make of it what we can, depending on our collective individual talents.

The lesson to be learned from this journey into the past seems to be that we in physical medicine are fortunately free of encircling boundaries, but to be successful physiatrists we must first of all be sound physicians, surgeons or investigators, with a wide interest and knowledge of the practice of medicine.

I hope that the achievements of our predecessors have been, at least in part, as interesting for you to hear about as they have been for me to uncover and that we all may be stimulated by them, so that through our own individual endeavors we may establish for all time the specialty of physical medicine as one of great depth, broad extent and symbolic of the best in medical practice.

# THE EFFECT OF SHORT WAVE DIATHERMY UPON DIGITAL CIRCULATION AS DETERMINED BY MICROPLETHYSMOGRAPHY *

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Previous investigations[1] have shown that the direct-recording photoelectric microplethysmograph serves as a sensitive and accurate recorder of the digital circulation and possesses certain distinct advantages over large volume recorders. In view of the recent controversial discussion concerning the effects of conversive heating upon the peripheral circulation, we felt that the microplethysmographic method could be employed more accurately.[2] The present report describes observations in 10 normal subjects.

## Technic

Continuous recordings of the volume of fluctuations in the great toe were obtained by means of a new ink-writing photoelectric microplethysmograph.[1] Variations less than 1 cu. mm. are easily recorded through a pneumatic system. Sensitivity, which may be varied up to full chart scale (50 divisions) for a volume change of 20 cu. mm., is usually adjusted to produce a deflection of 10 to 20 divisions. Calibration may be effected manually at any time or automatically every 10 minutes by introducing a volume change of 20 cu. mm. into the system. The response of the pen is linear within 5 per cent over the 50 divisions, and corrections for variations in linearity are computed by calibration over the entire scale. At a sensitivity of 1 division per 1 cu. mm. the noise level is less than ¼ division, corresponding to a volume change of less than 0.25 cu. mm. Four recording speeds are available depending upon the gear arrangement. The natural frequency is 5 cps., and the instrument is critically damped. The timing is automatic. Any alterations in the peripheral circulation are computed by contrasting the amplitude of the volume pulse wave and the rate of blood flow as measured by the venous occlusion method before and after the institution of any specific procedure.

The temperature and humidity of the room were recorded at the beginning and at the end of each experiment. The procedure to be employed was explained carefully to each subject so as to minimize psychic influences as much as possible. In accord with this, the electrodes were applied prior to the control period. One electrode was placed around the midthigh and another under the sole. Both electrodes were separated from the skin by a layer of felt 1 in. thick. The subjects reclined comfortably during the entire procedure. The period of control lasted for 30 minutes. Conversive heating was maintained for 20 minutes. A continuous microplethysmographic tracing was obtained during the control period, during the period of conversive heating and during the period required for the circulation to return to the original control levels. Six patients were subjected to ganglionic blockade by means of tetraethylammonium chloride intravenously. The results were analyzed by comparing the circulatory changes observed following conversive heating and ganglionic blockade with those noted during the period of control.

## Results

The effects of short wave diathermy upon the volume pulse amplitude and upon the rate of blood flow have been summarized in the table. It is evident

* From the Departments of Physical Medicine and Medicine, Mount Sinai Hospital.
* Read at the Twenty-Seventh Annual Session of the American Congress of Physical Medicine, Cincinnati, Sept. 8, 1949.

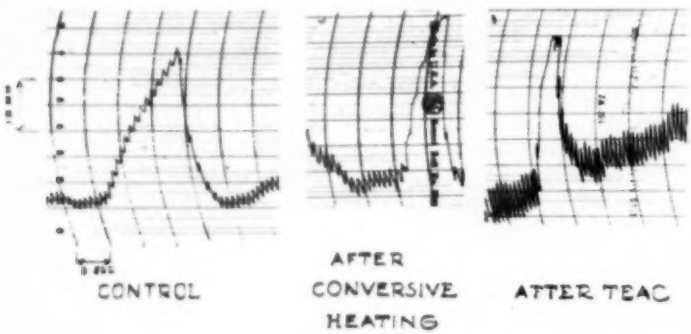
1. Megibow, R. S.; Neuhof, H., and Fritelberg, S.: Microplethysmography as a Criterion for Sympathectomy in Hypertension, J. Surg., Gynec. & Obst. 88:170 (Feb.) 1949.
2. Kemp, C. R.; Paul, W. D., and Hines, H. M.: Studies Concerning the Effect of Deep Tissue Heat of Blood Flow, Arch. Phys. Med. 29:12 (Jan.) 1948.

that the application of conversive heat induces a significant increase in the rate of the digital circulation. However, maximal vasodilatation is not obtained by this procedure, since a significantly greater increase in the blood flow was produced in the six patients who received tetraethylammonium. On the average, an

*Effect of Short Wave Diathermy on Volume Pulse Amplitude and Blood Flow.*

| Room | | Control | | After Diathermy | | After Tetraethylammonium | |
|---|---|---|---|---|---|---|---|
| Temperature, F. | Humidity, % | Volume Pulse Amplitude, Mm. | Blood Flow, Cc. 100 Cc. Min. | Volume Pulse Amplitude | Blood Flow | Volume Pulse Amplitude | Blood Flow |
| 77 | 42 | 3 | 11 | 11 | 80 | — | — |
| 74 | 48 | 2 | 28 | 8 | 60 | — | — |
| 74 | 51 | 0.5 | 3 | 2 | 10 | — | — |
| 75 | 56 | 0.5 | 4 | 3 | 23 | 8 | 110 |
| 72 | 50 | 0.5 | 6 | 5 | 52 | 10 | 86 |
| 73 | 46 | 2 | 4 | 4 | 18 | 6 | 108 |
| 72 | 48 | 10 | 16 | 10 | 50 | 20 | 74 |
| 71 | 50 | 4 | 26 | 12 | 64 | 14 | 106 |
| 72 | 46 | 1.5 | 6 | 3.5 | 14 | — | — |
| 74 | 42 | 0.5 | 8.5 | 12 | 49 | — | — |

increase in blood flow was observed within five minutes following the application of short wave diathermy. The rate of flow continued to increase slowly during the 20 minute period of local heating. It is, therefore, quite possible that further vasodilatation could have been obtained by a more prolonged period of conversive heating. The chart illustrates the increase in both pulse volume and in blood flow following the application of conversive heating. After the administration of tetraethylammonium further increases occurred in pulse volume and in blood flow.




Increase in both pulse volume and blood flow following application of conversive heating. Note that after the administration of tetraethylammonium further increases occurred in pulse volume and in blood flow. Calibration indicated to left of first plethysmogram is constant. The ordinates indicate time intervals of five seconds.

## Comment

The primary advantage of digital microplethysmography is based upon the fact that the circulation may be measured under physiological conditions. Possible sources of error in this method are based upon assessing the state of circulation in large vascular areas from results obtained from relatively minute portions of the vascular bed, such as a distant digit, and upon the fact that these areas are known to contain many arteriovenous shunts. In practice, though,

we have found that the digits may serve as very sensitive and accurate indexes of the circulation to an extremity. Our observations corroborate those of Wise,[3] Wakim,[4] Osborne[5] and their co-workers that in normal circumstances short wave diathermy will induce an increase in peripheral blood flow.

## Discussion

**Dr. Frederic T. Jung** (Chicago): Drs. Grynbaum, Megibow and Bierman should be complimented for calling our attention to the possibilities of a new form of apparatus in a field that has been beset with difficulties. I am sure that many of us who have done teaching would be interested to know whether Dr. Grynbaum would recommend his new apparatus for teaching demonstrations.

I should also like to ask the authors how they control the pulsations transmitted from other parts of the patient's body. I have found them very troublesome in the crude demonstrations that I have attempted to set up in the past, and I should like to know what the authors recommend for the elimination of this variable.

Finally, as a challenge to the authors, I should like to suggest that perhaps their technic would enable them to account for all of the redistributions of the blood caused by the tetraethylammonium compounds. The striking vasodilations which they produce in some parts of the body must be accompanied by equally marked vasoconstrictions in other parts.

**Dr. Joseph M. Markel** (Detroit): Were recordings made on direct or on reflex heating, and what would be the results of the two different forms of heating?

**Dr. Grynbaum** (closing): With reference to Dr. Jung's question, we believe that microplethysmography is a very excellent method for its particular purposes because it demonstrates very well and very easily the plethysmographic changes. The instrument is very expensive, and I do not know whether there are any on the market. Our instrument was built by Feitelberg, who is the physicist at the Mount Sinai Hospital. By means of it, blood flow can be measured with use of the venous occlusion method.

In answer to Dr. Markel's question, we did not observe the effect of reflex heat

3. Wise, C. S.: The Effect of Diathermy on Blood Flow (Plethysmographic Studies), Arch. Phys. Med. **29**:17 (Jan.) 1948.

4. Wakim, K. G.; Gersten, J. W.; Herrick, J. F., and Elkins, E. C.: The Effects of Diathermy on the Flow of Blood in the Extremities, An Experimental and Clinical Study, Arch. Phys. Med. **29**:583 (Sept.) 1948.

5. Stems, L. L.; Kosman, A. J., and Osborne, S. L.: A Comparative Study of Short Wave and Microwave Diathermy on Blood Flow, Arch. Phys. Med. **29**:759 (Dec.) 1948.

# AN APPROACH TO DYNAMIC POSTURE BASED ON PRIMITIVE MOTION PATTERNS *

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The concept of posture has undergone frequent changes during the last decades. Until recently good posture was defined as a static position of standing as seen in military schools[1]: chin in, chest in inspiratory position, abdominal muscles contracted, shoulder blades adducted, buttock muscles contracted, toes pointing forward, arms down to the side, adducted and fingers pointing rigidly downward. This position is based on conscious active contraction of different muscle groups. It cannot be held for any length of time, and it is uneconomical, owing to contraction of many muscle groups which would normally not be called into action, or at least not to the same extent. This position also impedes normal breathing through the active contraction of the upper abdomen, and it is artificially superimposed on the natural play of postural reflexes in the normal standing position.

The present trend deviates more and more from this static concept of posture toward a more dynamic one, taking into account the different postures occurring in daily life.[2] Other static positions, like sitting, and movements, like walking, are being included into the definition of posture.[3] The concept of what has been termed dynamic posture goes still further. It has been defined as the sum total of all movements required in daily life and the adaptation of the body to the infinite variety of these movements. One speaks of good dynamic posture if this adaptation takes place with the least expenditure of energy and highest efficiency.

Correct dynamic posture is an outcome of the physiological use of the body as an entity. If a child is given ample opportunity to follow his own ontogenetic development of dynamic posture through the kicking, creeping, half-upright to the upright stage, he is likely to develop perfect dynamic as well as static posture. There will be a constant repetition of primitive synergic movements, such as kicking, creeping, climbing, walking and running, and of more complicated ones such as skipping, jumping, etc. All these movements make use of the body as an entity.

If we try to analyze dynamic posture, we can define three main components: muscle balance, grading of muscle contractions and timing of muscle contraction and relaxation. Muscle balance constitutes the accomplished equilibrium between the antagonist and protagonist groups of muscles. Grading of muscle contraction can be defined as the variation in the degree of contraction occurring in various muscle groups — according to the requirements of any individual movement. This grading of muscle contraction presupposes the full development of the proprioceptive reflexes, resulting in accurate muscle and joint sense. Timing represents the sequence of contraction and relaxation in different muscle groups in relation to time.

All three elements are tightly interwoven, and good coordination and dynamic posture will result only if all of them are functioning normally.

* From the Department of Physical Medicine, Columbia Presbyterian Medical Center.

1. Krusen, F. H.: Physical Medicine, Philadelphia, W. B. Saunders Company, 1942, 588.
2. Howorth, M. B.: Dynamic Posture, J. A. M. A. 131:1188, 1946.
3. Braune, W., and Fischer, O.: Der Gang des Menschen, in Abhandlungen der mathematischen physikalischen Klasse der königlich sächsischen Gesellschaft der Wissenschaften, 1895, pp. 153-504.

Dynamic as well as static posture is based on postural reflexes which have undergone a variety of changes in the phylogenetic development from the four-legged to the two-legged animal and in the ontogenetic development from the human infant to the upright position. These postural reflexes are mainly based on subcortical centers at different levels.[4]

The development of good dynamic and static posture depends, therefore, upon the repetitive use of primitive motion patterns based on postural reflexes.

Poor static and dynamic posture might develop in a child who has been forced too early or for too long intervals into static positions, like sitting in a highchair or like being cooped up in a play pen. Overemphasis on the development of specific movements and skills, as writing or school work in general, may restrict the child from performing often enough the automatic primitive synergent motions on which the development of good dynamic posture depends.

An approach to dynamic posture based on primitive motion patterns was conceived by Klapp[5] and further developed by Thun Hohenstein.[6] Through repetitive use of automatic physiological movements, normal coordination of muscle balance, grading of contraction and timing of contraction and relaxation may be enhanced.

The principal characteristics of this exercise approach aiming at developing good dynamic posture are the following:

1. The movements follow the primitive automatic motion patterns seen in animals and human beings or are modifications thereof. Therefore, they are intrinsic to our motor organization.

2. The same motion pattern can be followed from the supine or prone position through the knee-elbow, knee-hand, half-upright to the upright position.

3. The movements are synergic in character. They comprise the entity of the body so that muscle groups when strengthened or stretched find their place in the coordinated motor organization of the entire body while this is being accomplished.

4. The movements have an intrinsic rhythm, such as one finds in the primitive synergic movements of animals.

5. They are dynamic in character, one phase of the movement leading by necessity to the next.

If correctly performed, these movements are economical and, therefore, graceful.

7. They can be adapted to the needs of the different individuals. These needs have to be determined by thorough examination and measurements.[7]

We shall make an attempt to describe a few of these movement sequences and their effect on muscle balance and coordination. Such an attempt can only be sketchy, as it is difficult to describe a continuous motion. In order to get more clarity, drawings have been used.

The first sequence of movements to be described is based upon the reciprocal diagonal motion pattern, reciprocal meaning synchronization of movement in opposite direction.

We shall point out the muscle groups mostly affected by these exercises,

4. Magnus, Rudolf: Koerperstellung; Berlin, Springer-Verlago, 1924.
5. Klapp, R.: Funktionelle Behandlung der Skoliose, Jena, G. Fischer, 1997.
6. Personal communication to one of the authors (J. S. H).
7. Kraus, H., and Eisenmenger-Weber, S.: Evaluation of Posture Based on Structural and Functional Measurements, Physiotherapy Rev. 25:267, 1945.

although only those muscle groups which are most important for the maintenance of upright posture will be discussed.

## Lying

*Supine*

Starting position (fig. 1 *A*)

Exercise 1. (*a*) This position can be likened to the position of the embyro in utero, with hips flexed and slightly abducted and with knees flexed, elbows flexed between the knees, forearms supinated.

(*b*) Extend one diagonal (right arm and left leg) perpendicularly, while the other one is being flexed (fig. 1 *B*) and vice versa.

(*c*) Extend one diagonal horizontally while the other one is being flexed (fig. 1 *C*).

The low back should be flat.

If the patient's hamstrings need active stretching he will do exercise (*b*).

If the abdominals need power building proceed guadually from (*a*) to (*c*).

*Prone*

Starting position.

Exercise 1. Arms down to sides. Lift diagonal extremities while the other diagonal is lowered (fig. 2 *A*).

This strengthens predominantly the low back muscles and the hip extensors.

Exercise 2. Arms above head. Lift one diagonal while the other diagonal is lowered (fig. 2 *B*).

This exercise increases muscle power in the erector trunci and hip extensors and stretches the pectoralis group.

## Creeping

In creeping, the telescoping influence of gravity upon the spine is eliminated. The spine is stretched out between the shoulder girdle and the pelvis, like a wire between two telegraph poles. The excursions of the spine in the creeping position are greater than in the upright position, through the greater mobility of the pelvis and shoulder girdle in relation to each other. The excursions are brought about by the trunk muscles which are in constant active play. Coordination between trunk and extremities is forced upon the patient. Creeping is a motion intrinsic in our motor organization.

Each of the different creeping patterns and their modifications have a different effect upon the shape of the spine (figs. 3 and 4); therefore, we have means in our hands to influence the shape of the spine according to the need of the patient. We shall discuss two types of creeping patterns. Both patterns are the forerunners of walking. They are found in infants and they contain the foundation of the human gait. 1. The diagonal reciprocal creeping, broken up in four beats, with the support in the diagonal. This corresponds to the walking pattern of the horse. 2. The diagonal reciprocal creeping pattern in two beats. This corresponds to the walking pattern of the human gait.

Figure 5 shows the starting position for any knee-hand creeping. The distance between hands is about the width of the shoulders; distance between knees is about the width of hips; distance between knees and hands is about the length of the trunk, so that thighs and arms are perpendicular to the floor, spine in middle position; eyes directed forward.

The first movement is in a four-beat rhythm, but for teaching purposes it will be divided into eight beats.

As the starting position (fig. 5) does not recur in the creeping pattern,

the first cycle is somewhat distorted. Figure 6 *A*, *B*, *C* and *D* show one cycle of movements taken out of the progressive motion pattern.

Beat 1: Left knee pulled up toward stomach, accompanied with flexion of the spine(fig.6 *A*).

Beat 2: Place knee behind the left hand (fig. 6 *B*).

Beat 3: Shift weight upon left knee, extend left hip slightly, stretch left hip slightly, stretch left side of trunk, simultaneously extending spine, bringing the left shoulder forward. As the arm follows, stretch arm forward and upward; right leg follows completely relaxed. Note the support in the diagonal during transfer of weight from left leg to left arm (fig. 6 *C*).

Beat 4: Place extended arm on floor (fig. 6 *D*).

The same four beats are repeated on the right side, so that eight beats complete one cycle of movement. The influence of this creeping pattern on the shape of the spine is shown in figure 3. The C shaped curve corresponds to beat 1. The S shaped curve corresponds to beat 3. If the movement is performed in four beats, as one sees it in infants and horses, the hand leaves the floor the moment the knee touches and vice versa.

The second movement is the diagonal reciprocal creeping pattern. The rhythm of this movement consists of two beats, but, again it should be broken up into four beats for teaching purposes.

The starting position as in figure 5.

Beat 1: Bring the right diagonal (right arm, left leg) forward, left knee toward stomach and right arm up and forward. This flexes the lumbar region of the spine and extends the thoracic spine. At the same time, the spine is swung into a convex curve to the right (fig. 7 *A*).

Beat 2: Place right diagonal on floor, transferring weight from left diagonal to right (fig. 7 *B*).

Beats 3 and 4: Repeat the same motion in the left diagonal. If the cycle is performed in two beats, the one diagonal leaves the floor the moment the other is placed on it. The influence upon the shape of the spine is shown in figure 4. The short C curve responds to beat 1.

If indicated, both movements can be performed on knees and elbows or feet and hands. The knee-elbow variety is very useful for scoliosis, as exercise for derotation and for mobilization. The motions are performed on knees and elbows instead of knees and hands in the same pattern. At beat 3 in the first creeping pattern, corresponding to the walk of the horse, the left hip extends slightly, followed by stretching of the left side of the trunk. Then the left elbow extends with the hand still fixed to the floor, causing a rotation in the spine.

By using the various basic patterns, only two of which are described here, and by combining them, it is possible to find a creeping step to counteract almost any type of spinal curve. For instance, modifications of the creeping steps can be brought about by describing a circle with one arm, or by having one extremity swing back before initiating the movements, thus increasing the mobilizing and derotating effect upon the spine.

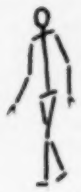
The creeping pattern performed on hands and feet is excellent training for coordination but very complicated and need not be described in a medical paper.

## Upright Position

In order to transfer the movements gradually from the horizontal plane to the upright position, they should be performed on a slanted ladder. Attention should be directed to the extension of the hips which is not complete, and to the position of the head: the cervical spine gradually changes from


1A
1B
1C
2A
2B
3
4
5
6A
6B
6C
6D
7A
7B
8A
8B
8C
8D

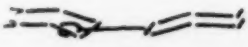
9A



9B

10A

10B



10C

11A

11B

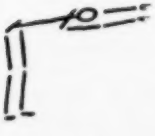
12A

12B

12C

13A

13B



13C

13D

13E

14

the hyperextended position of the creeping position to the extended position of the upright posture. In the upright position the creeping pattern (fig. 6), (walk of a horse) is used only in walking up a mountain with a cane, in crutch walking or in ski walking, but it is good practice, since it contains the elements of the diagonal reciprocal human walk.

Again we shall break up the four-beat pattern into eight beats. The patient uses a cane in each hand.

Starting position.
Standing position, feet parallel slightly apart, canes placed in front of feet.
Beat 1: Flex left lower extremity at hip, knee and ankle (fig. 8*A*).
Beat 2: Step forward (fig. 8*B*).
Beat 3: Shift weight over left foot by moving left hip forward over left ankle, forward, knee and hip extend, the right arm hits the air and swings the hip with slight rotation to the right and swinging of the left arm forward (fig. 8*C*).
Beat 4: Place cane in front of left foot (fig. 8*D*).

Observe the similarity between the knee-hand crawl and the eight-beat upright walk. The same four-beat pattern follows on the right side.

The reciprocal diagonal walk in the two-beat pattern broken up into four-beats shows the following sequence:

Starting position.
Standing position, feet parallel, slightly apart, arms down to side.
Beat 1: While the left leg swings forward, slightly flexed, the rotation of the trunk to the left over the pelvis takes place, bringing the right arm forward (fig. 9*A*).
Beat 2: While the left foot is placed on the ground and the weight transferred forward, knee and hip extend, the right arm hits the air and swings back. While the weight is shifted to the left foot, the right leg swings passively forward to about the midline, exactly as it does in crawling, completely relaxed, thus initiating the forward swing of the right leg (fig. 9*B*).
The same two beats occur in the other diagonal.

A discussion of the kinesiology of the muscles involved in walking has been omitted, as this would lead us beyond the scope of this paper.

Another series of movements which can be used to advantage in posture training is based on the movements of the positive and negative stretch reflex, all four extremities flexing at the same time and then extending simultaneously. This exercise can be carried out in supine, sitting, half-upright and upright positions.

*Supine*
Starting position (fig. 10*A*).
Hips and knees are in the position of flexion; elbows flexed between knees, similar to the position of the embryo in utero.
Exercise 1. (*a*) Extend legs and arms simultaneously toward ceiling (fig. 10*B*).
(*b*) Extend legs and arms simultaneously to the horizontal position (fig. 10*C*).

Exercise 1(*a*) will stretch the hamstrings; 1(*b*) will strengthen the abdominal muscles. The cervical spine should be actively straightened. This extension of the cervical spine in the sense of decreasing the cervical lordosis is of great importance for the upright position as this region is one of the key points for correct upright posture. Hansson[8] points out that the cervical fascia continues into the pericardium, which, in turn, is attached to the center of the diaphragm. The diaphragm, in turn, supports most of the large abdominal organs. Pulling on the cervical spine by extending it lifts the center

8. Hansson, cited by Krusen,[1] p. 561.

of the diaphragm and thus helps to support the abdominal organs. Furthermore, Haines[9] directs our attention to the fact that straightening of the cervical spine lifts the chest and increases tone of the abdominal muscles and the supporting tone in the lower extremities.

These reflexes are of importance for the correct upright posture, especially as they are not based on voluntary active contraction of the abdominal and hip muscles, which never can be held for any length of time.

A modification of this exercise requiring greater power in the abdominal muscles is the following:

*Sitting*

Starting position.

Complete flexion of trunk, neck and extremities, with feet off the floor (fig. 11*A*).

Do a complete horizontal extension of the trunk and legs with the feet off the floor (fig. 11*B*).

*Sitting*

Starting position.

Complete flexion of trunk, neck and extremities in the sitting position with feet on the floor (fig. 12*E*).

Exercise 1. (*a*) Extend trunk in a right angle to the extended legs (fig. 12*B*).

(*b*) Reach with hands toward the toes of the extended legs (fig. 12*C*).

Exercise (*a*) stretches hamstrings, increases strength in the erector spinae and in abdominal muscles.

Exercise (*b*) increases flexibility of the spine and stretches hamstrings.

*Standing*

Starting position (fig. 13*A*).

Similar to the position of the embyro in utero.

Exercise 1. (*a*) Extend arms and legs, simultaneously reaching towards the floor, the elbows and knees staying at about the same level during extension. The feet are parallel, weight slightly forward so that the gastrosoleus is stretched and the heel pulled slightly off the ground (fig. 13*B*).

This can also be done in locomotion by shifting the point of gravity slightly forward during extension which will result in a slight jump forward into flexion. This exercise strengthens the quadriceps, stretches the hamstrings and increases the flexibility of the lower back.

(*b*) Extension of the trunk in the horizontal position with the spine completely straight and the arms in continuity with the trunk (fig. 13*C*).

This actively stretches the hamstrings and pectorals, is power building for the quadriceps, glutei, lower and upper back muscles.

(*c*) Extension into the upright human position. The arms can be extended overhead (fig. 13*D*) or down to the side (fig. 13*E*).

Special attention is given to the full extension of the pelvis on the femur and to the straightening of the cervical region, thus reducing exaggerated physiological spinal curves. This exercise is power building for the quadriceps and glutus muscles; but, its main purpose is to teach the erect position, not as a fixed position but as a part of the play between flexion and extension. The full extension of the pelvis on the femur counteracts exaggerated lordosis. Combined with straightening of the cervical spine, the entire spine is elongated, forming the basis for the ideal upright posture. With this elongation goes an increase in the tone of the lower abdominal and glutus muscles and a decrease in the kyphosis of the thoracic spine, concommitant with lifting of the chest. The shoulder girdle is loosely suspended from the chest without pulling the shoulders in any direction. The upper abdomen is free

9. Personal communication to the authors.

to support diaphragmatic action in breathing. The increased tone in abdominal and gluteus muscles is of a reflex nature and not voluntarily brought about by conscious contraction. This erect position seems natural and full of possibilities of action. No muscle groups are held by effort and it does not convey the impression of artificiality as does the military standing position.

With the center of gravity slightly shifted forward, this position constitutes the preparatory position for the human walk or run according to the degree of forward shift of the center of gravity. It has been called the upright starting position.

A modification of the upright flexion extension movement is shown in figure 14. The flexion of the extremities and trunk is not complete but the spine is slightly flexed with the apex of the curve in the lumbar spine, the symphysis and sternum slightly approximated, elbows slightly flexed, and all joints of the lower extremities in middle position.

This position constitutes the basic position for going into action, be it lifting or pushing, descending or ascending stairs, skiing, opening a door, etc., the extension movement being the same as described in figure 13 *D* and *E*. It has been termed the medium starting position.[3]

The standing exercises lie completely in the sphere of the upright human movements. Of course, various other modifications of the flexion-extension movements are possible. They can be performed alternating or reciprocal, right arm and right leg or right arm and left leg, and vice versa. Also a variety of dance steps can be developed out of the upright flexion-extension movements and their modifications.

If working for muscle balance one is apt to find in this variety of exercises appropriate movements for the different muscle groups that need either stretching or strengthening. While such a muscle group is being stretched or strengthened it finds its place in the entity of the complex motor organization. Thus, all three components of dynamic posture are being exercised as well, namely, timing, grading of muscle contraction and muscle balance.

## Summary

An approach to dynamic posture through exercises based on primitive motion patterns has been described. Three sequences of movements have been shown in detail. The first is based on the diagonal reciprocal creeping, corresponding to the walking pattern of the horse. The second is the diagonal reciprocal creeping pattern, corresponding to the human gait. The third sequence is based on the type of movement seen in the positive and negative stretch reflex.

# THE INFLUENCE OF CERTAIN HYPERKINEMIC AGENTS ON SKIN TEMPERATURE *

## Preliminary Report

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Counterirritants of various types have been employed empirically for generations as analgesic agents. Because of their rubefacient action, the pain-relieving qualities of such substances have been rather loosely ascribed to "improvement in circulation" and increase in skin temperature. Other chemicals, notably, acetyl-β-methylcholine and histamine, are used with frequency in physiatric practice, especially when introduced into the skin by the method of common ion transfer; these agents also produce increase in skin temperatures.

In the clinical use of these agents, it is obvious that the vascular bed is not influenced equally by them. Some produce hyperemia as the result of venostasis, others through diminution of arteriolar tone and still others through dilatation of the capillary bed. Since only those agents which produce arteriolar dilatation would increase blood flow through the peripheral vascular bed, we agree with the suggestion of Lange and Weiner[1] that the term "hyperkinemic" be applied to these substances in contrast to those which produce hyperemia only.

Recently a solution has been made available to us for investigative use which induces hyperemia and a sensation of increased warmth when applied topically. This compound[2] is a derivative of nicotinic acid, n-hexyl-3-pyridine carboxylate. It is supplied as a 3 per cent solution in isopropyl alcohol, is practically colorless, has the bitter odor characteristic of nicotinic acid and induces a bright pink hyperemia 10 to 15 minutes following its application to the skin. The hyperemia induced persists for many hours. It is the purpose of this study to examine the hyperkinemic properties of this substance and to see whether these properties could be modified by the method of ion transfer.

### Procedure

Thirteen subjects were used. Basal or constant skin temperatures were secured by having the subject lie quietly in a standard hospital bed and expose the extremities for one hour to a room temperature which did not vary more than 2 degrees from an average of 80 F. during the experiment.

The hyperemic solution was applied to the volar surface of one forearm by wetting a thin cotton powderpuff which measured 2 inches in diameter. A thin film of 1 per cent histamine ointment was gently rubbed into an adjacent skin area and covered with a puff soaked in isotonic sodium chloride solution. A third area was covered only with a saline-soaked puff. Covering the electrodes, yet not touching the skin between them, was a piece of diathermy metal which was connected to the positive pole of a

* Read before the Midwest Section, American Congress of Physical Medicine, Iowa City, May 11, 1950.

† From the Department of Physical Medicine, University of Kansas Medical Center.

1. Lange, K., and Weiner, D.: The Effect of Certain Hyperkinemics on the Blood Flow Through the Skin, J. Investig. Dermatol. 12:263, 1949.

2. Supplied by the George A. Breon Company, Kansas City, Mo., through the courtesy of C. W. Getter, M.D., Medical Director.

standard galvanic current generator. The indifferent electrode was placed on the shoulder or arm posteriorly. Ten milliamperes of direct current was then passed between the electrodes for 10 minutes. A setup exactly similar, except for the passage of the direct current, was applied to the opposite forearm in half the cases or to the thigh of the same side in the remaining cases. By this means it was believed that the effects of the hyperemic solution could be compared with a known hyperkinemic agent, histamine, and that both could be compared with a substance inert from this standpoint, the saline solution. The influence of the galvanic current could be inferred from comparison of the two areas treated.

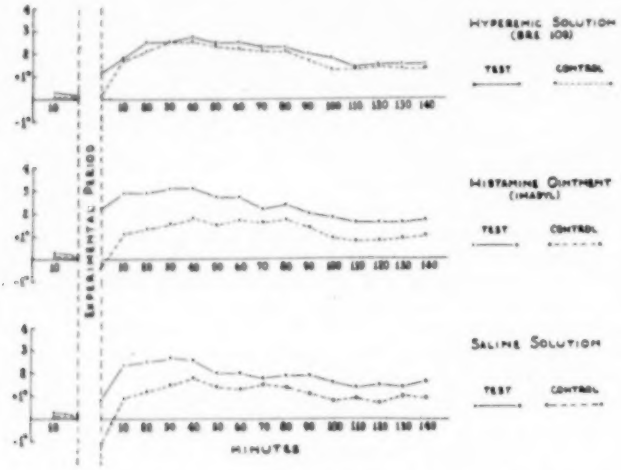
Skin temperatures were recorded by a Rauh Surface Pyrometer. Corrections for minor variations in room temperature were made prior to each temperature reading. The temperature of each spot was measured immediately after the electrodes were removed and the skin surface blotted dry. Measurements were taken in as nearly the same area as possible at 10 minute intervals for a minimum of 120 minutes after the experimental period.

The region through which the direct current was passed is referred to as the test or treated area. The region where the substances were applied but not connected with the electric circuit is referred to as the untreated or control area.

## Results

The summarized data are shown in the chart.

*Hyperemic Solution.* — Immediately after the termination of the ion transfer, the skin under both regions (treated and control) was hyperemic and




Effect of ion transfer on hyperkinemic agents; skin temperature change.

grossly felt warmer than the surrounding skin, both subjectively and objectively. The hyperemia and increased temperature were more marked in the region of ion transfer. As time progressed, however, the untreated area on the opposite forearm or the thigh became progressively warmer until after 30 minutes following termination of the ion transfer the test and control temperature curves were practically identical. The cooling phases of the two curves were likewise identical. An average of 2 degrees F. increase in skin temperature was noted, the individual variations being from 1½ to 4 degrees. This increase was maintained for 90 minutes in both the ion transfer and the control areas. After the skin temperature returned to normal, the sensation of warmth persisted for several hours. In several instances the hyperemia was still visible 24 hours later.

*Histamine Ointment.* — All subjects demonstrated a greater increase in skin temperature in the area where the histamine was administered by ion transfer than in the control spot where the galvanic current was not employed. The increase in temperature was noted immediately and was maintained at the plateau level for 40 minutes. The average increase in temperature was 3 degrees. The usual histamine wheal was noted in the area where the galvanic current was passed; the skin was faintly hyperemic and subjectively felt warmer than the surrounding area. The control area showed no wheal, was not consistently hyperemic and subjectively felt only slightly warmer than the surrounding skin.

*Saline Solution.* — Soon after the experimental period was terminated, the area beneath the galvanic electrode began to demonstrate hyperemia and a rise in skin temperature. The temperature rise averaged 2½ degrees and was maintained for 40 minutes before declining. Although the superficial temperature was approximately equal to that produced by both the hyperemic solution and the histamine ointment, the subjects consistently felt an increased sensation of warmth in the latter two areas. Interestingly enough, the control area, in which a saline-soaked pad only was placed on the skin surface, demonstrated a faint hyperemia, a slight sensation of warmth and a mild temperature rise, of 1 to 1½ degrees for 90 minutes following the experimental period. It should be noted also that in the control area immediately after the experimental period nearly all subjects demonstrated a decrease of 1 to 2 degrees below the basal skin temperature level.

## Comment

This brief experiment demonstrates the difference between hyperemia and hyperkinemia. The hyperemic solution is well named in inducing a prolonged cutaneous hyperemia with a mild, evanescent hyperkinemia.

The hyperkinemic properties of this solution are not enhanced by the method of ion transfer. There is evidence, however, that the compound is introduced through the skin and into the subepithelial lymphatics or vascular channels, since all subjects demonstrated spread of the hyperemic area 1 to 2 cm. beyond the confines of the electrode and the majority showed "metastatic" patches of hyperemia in regions sufficiently remote from the area of original application to preclude accidental contact of the parts or transfer of the solution other than by the vascular or lymphatic channels.

No clinical implications are drawn from these data. Only normal subjects were employed in whom a normal skin temperature and normal vasomotor reflex responses are assumed. Various clinical syndromes characterized by pain, for example, are known[3] to be associated with alterations in skin temperatures and vasomotor responses in general.

It should be noted also that the "control" areas are not basal in representing areas which were not disturbed. The action of the saline solution by ion transfer provides sufficient irritation of the vasomotor receptors to account for the hyperemia.[4] The rise in skin temperature in the area which had only the saline-soaked pad covering it may represent the reactive hyperemia from the initial vasoconstriction and drop in skin temperature produced following removal of the electrode.

## Summary and Conclusions

Thirteen normal subjects were tested for their response to two hyperkinemic agents. From this study, the following conclusions are drawn:

3. Lewis, T.: Pain, New York, the Macmillan Company, 1945, pp. 59, 61, 105, 116.
4. Kovacs, R.: Electrotherapy and Light Therapy, Philadelphia, Lea & Febiger, 1948, p. 141.

1. A derivative of nicotinic acid when applied topically as a 3 per cent alcoholic solution is capable of inducing a prompt and prolonged cutaneous hyperemia and a mild, transient hyperkinemia.

2. The hyperemic but not the hyperkinemic properties of this solution are enhanced by the method of ion transfer.

3. The hyperkinemia is of less magnitude than that induced when histamine is similarly employed.

4. The 1 per cent histamine ointment is a poor hyperkinemic agent in itself but under the influence of the constant current exhibits excellent hyperkinemic properties.

5. Saline solution, when administered by the method of ion transfer, will induce both hyperemia and hyperkinemia, but the hyperemia is objectively and the hyperkinemia is subjectively not so intense as that noted following administration of the hyperemic solution or the histamine ointment.

# IS THERE A DISPLACEMENT OF THE MOTOR POINT?

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The term motor point denotes an area of the skin over which muscular contraction can most easily and most efficiently be elicited. There are motor points of nerve trunks and of muscles; the former exist at the point where the nerve is nearest to the surface and therefore is most accessible to stimulation, and the latter are generally found where the corresponding nerve branch enters the muscle.

In 1876, E. Remak observed a case of lead poisoning paralysis, in which the paralyzed muscle contracted during cathode closure and the strength of this contraction increased "as the electrode came nearer to the tendon." In 1891, Doumer found in some cases of late infantile paralysis that the stimulation from the motor point was ineffective but was possible from a distal point. He named this phenomenon *réaction longitudinale*. Huet found this reaction in a few cases of recent neuritis. Wertheim-Salamonson demonstrated in extended experiments that the reaction of Remak-Doumer (so named in France) occurs in all cases in which a reaction of degeneration is found and recognized in the displacement of the motor point — as he called this phenomenon — an import sign of the reaction of degeneration.

The explanation for the displacement of the motor point is physical. The electric excitation of a muscle is, as a rule, conveyed by its motor nerve. During the so-called indirect stimulation, it is done by the motor nerve itself, and during the direct stimulation it is conveyed by its intramuscular ramifications. In the case of a severe motor nerve damage, these intramuscular ramifications, including the terminal plaques, are destroyed and excitation of the muscle by the way of its nerve is not possible. Nevertheless, the denervated muscle will still respond to the current because its fibers have their autonomous contractibility; however, the conditions under which this contraction will occur and their character are materially changed. The changes

include the lack of response to the rapid faradic impulses. The denervated muscle responds only to a much longer current impulse, as is found by the closure and opening of the galvanic current. As the denervation persists, an increasing amount of current is necessary to elicit a contraction. Also the strength-duration rate of the denervated muscle is higher than that of a healthy muscle.

The salient characteristics of the denervated muscle is the slow, torpid and "wormlike" contraction. This phenomenon, as introduced by W. Erb, is considered the most important sign of the reaction of degeneration and alone proves that the muscle has lost its nerve supply and that its contractions are caused by stimulation of the muscle substance itself. The same torpid contraction is shown by the fetal muscle, where the union of the muscle and its motor nerve has not yet been established. When the motor nerve is degenerated, it does not conduct, and the result is inability to excite the muscle through the nerve branch entering the muscle. Therefore, according to the definition given above, the muscle motor point must be considered lost. The muscle fibers, deprived of their end plates, are now autonomous and are affected individually by the current. The more muscle fibers that are included in the current circuit, the stronger the contraction, since each fiber is subjected to the "all or none" law. The number of affected fibers depends on the position of the electrodes. In the unipolar technic, which is most frequently used, the inactive or indifferent electrode is placed over the trunk, back or sternum, whereas the active or different electrode is placed over the muscle point. To illustrate in a case of paralysis of the biceps, with the active electrode over approximately the middle of the muscle belly and the inactive electrode over the trunk, only the proximal half of the muscle is stimulated by the current. By displacing the electrode distally, a greater amount of the muscle is subjected to the current. Finally at the point of transition of the muscle into its tendon, the muscle with all its fibers is traversed by the current, resulting in the strongest contraction.

If this explanation of the displacement of the motor point is correct, a change in the arrangement of the electrodes should make it possible to displace the motor point to the opposite side, i. e., to the proximal end of the muscle. For this purpose the hand is immersed in a galvanic bath to become the inactive electrode. The inactive electrode is now no longer proximal but distal to the active or testing electrode. With the electrode at the distal end of the muscle, over the supposedly displaced motor point, no contraction is secured. Why? Because none of the fibers of the paralyzed muscle are in the field of the current. Gradually by moving the electrode proximally on the muscle the strongest contraction is secured when the testing electrode is over the proximal end of the muscle. Thus the motor point is displaced to the proximal end of the muscle.

Further proof of the correctness of this explanation could be furnished by dividing the inactive electrode, i. e., by using two electrodes of the same polarity and placing them over the distal and proximal ends of the muscle. The motor point is found to be in the middle of the muscle. Thus the displacement of the motor point is only an apparent one. In reality the motor point has disappeared.

## Summary

In muscles showing a reaction of degeneration a loss of the motor point and not a displacement occurs. A point of maximal excitability may be secured by changing the position of the indifferent electrode.

# CARE OF THE AFTER-EFFECTS OF POLIOMYELITIS

## Forearm and Hand *

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### Introduction

When it is realized that next to the brain the hand is the greatest asset of man, the importance of achieving a maximum functional result is apparent. The ultimate functional capacity depends upon the effectiveness of early and convalescent care of the surviving motor units. Obviously, this treatment begins as soon as the diagnosis is made and the patient's general medical condition permits.

Before involvement of the forearm and hand is discussed, several observations about the normal state should be noted. At rest the forearm and hand assumes an attitude in which each joint is in the midposition of its range of motion. The muscle balance necessary for maintenance of this position is supplied by three groups of muscles: the long flexors, the long extensors and the intrinsics of the hand. The involvement of any of these upsets the balance, and a position of deformity is assumed. If this malposition is maintained, secondary changes in the soft tissue, joints and bones occur, and deformity ensues.

A typical pattern of deformity resulting from persistent maintenance of faulty position is demonstrated by flexion of the elbow, pronation of the forearm, flexion and ulnar deviation of the wrist, "clawing of the hand" and "cocking-up" of the thumb. Usually patients with these deformities have been in a respirator a long time and their hands have assumed the contour of the body upon which their hands have rested.

In reviewing the cases of the last thousand patients admitted to the Georgia Warm Springs Foundation, we have noted involvement of the forearm and hand in 199 of whom 107 have involvement of one forearm-hand and 92 have involvement of both forearms and hands.

### Early Care

Early care of the involved segment begins the moment the patient's condition permits and should embrace three major objectives: (1) relief of pain; (2) release of tightness; (3) support of weakness. Relief of pain may be accomplished by local application of heat in the form of warm, moist fomentations and support in the position of comfort. It should be noted that any position affording comfort is permissible in the very early stages, and transition to the functional position should be made under the dictates of pain. With the relief of pain, the release of tightness may be furthered by passive motion to achieve gradually a painless, functional range of motion in each joint. During the early stage, support of weakness may adequately be obtained by proper positioning of pillows and sandbags. If the hand is too sensitive to permit application of any type of splinting, a small pillow

* Read at the Twenty-Seventh Annual Session of the American Congress of Physical Medicine, Cincinnati, Sept. 9, 1949.

can be fashioned to assume a cock-up position for the wrist; the fingers can flex easily over the end of the pillow, and the thumb can hang over one side in position of palmar abduction. The hand may be supported by a roll of bandage, holding the fingers in slight flexion and thumb in a position of opposition. A simple cock-up splint for the wrist may be fashioned by the addition of a padded board, with a section cut out for thumb to assume a position of opposition. Naturally, the facilities at hand will determine the type of support used.

## Convalescent Care

During the early phase, evaluation of weakness should be based on observation of movements and gentle palpation of tensions in muscle groups.

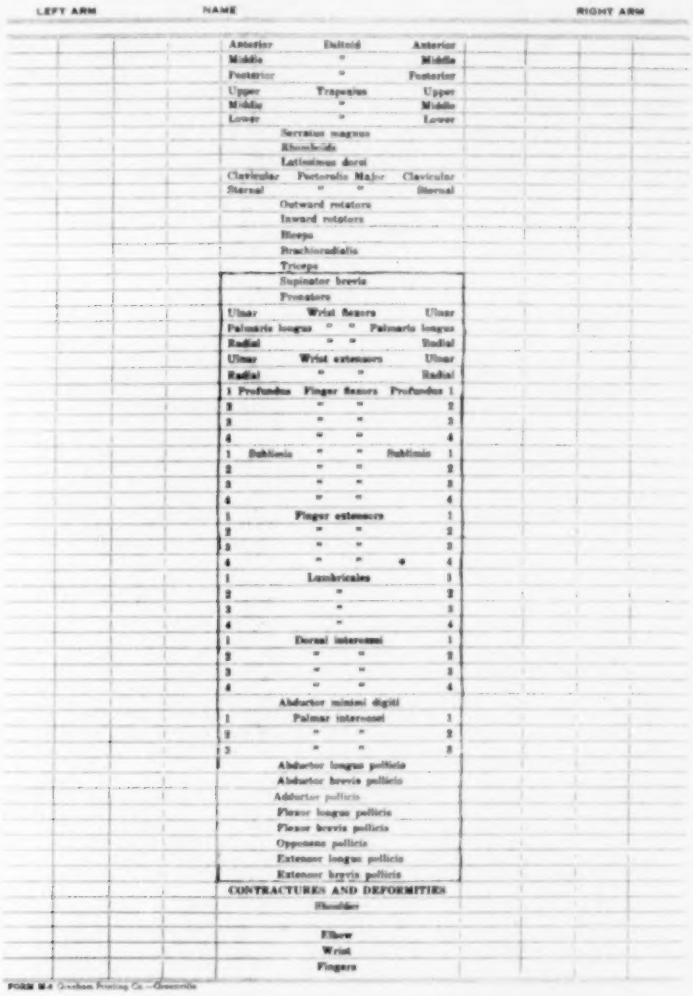


Fig. 1. — Muscle test sheet for upper extremities (Georgia Warm Springs Foundation).

As soon as a painless, functional range of motion is obtained, a detailed muscle test should be made (fig. 1). During this phase of treatment, the early convalescent period, the individual muscle or muscle group is the unit specifically involved needing muscle reeducation. Early detection of weakness in the long finger extensors, intrinsics of thumb, lumbricales and first dorsal interosseus is especially important, since prognosis for recovery is poor if treatment is delayed.

Coordination is the keynote in muscle reeducation, and all motion (passive, active-passive, active and active-resistive) must be carried out in the normal pattern. The complexity of this pattern is appreciated when the movement of thumb from the side of the hand to the position of opposition is performed. The position of palmar abduction is assumed by action of the abductor pollicis longus with stabilization of the first metacarpel by the extensors pollicis, longus and brevis; internal rotation and flexion are carried out by successive actions of the opponens, abductor pollicis brevis, flexor pollicis brevis and flexor pollicis longus. This, perhaps, is the most difficult and at the same time the most important period in the phase of muscle reeducation. It is amazing what an ultimate functional result is possible in a completely coordinated segment even though individual muscle strength is impaired. Strengthening of individual muscles or muscle groups should be stressed only after coordination has been firmly established. During this early phase of muscle reeducation, certain supportive and/or assistive apparatus may be necessary for fulfilment of the normal pattern of motion.

## Supportive Apparatus

Some of our supportive apparatus are shown in figures 2 and 3.

Figure 2 shows the basic opponens splint which supports the thumb in abduction and permits internal rotation and flexion of the thumb in a normal pattern of opposition. It also prohibits overuse of the adductor and extensors of the thumb.

Figure 2 *B* shows an opponens splint with wrist attachment to protect weakened wrist extensors.

Figure 2 *C* presents an opponens splint with wrist and lumbricales attachments which prohibits stretching of the weakened lumbricales and prevents shortening of extensor group.

An opponens splint with wrist and platform attachments (fig. 3 *A*) supports weakened finger extensors; it is imperative to protect weak finger extensors early as the pull of the stronger flexors and gravity (in the normal resting position) will delay or limit their ultimate recovery.

An opponens splint with a first dorsal interosseus bar (fig. 3 *B*) protects the first dorsal interosseus muscle, which is so important in the combined action of the index finger with the thumb.

Naturally, the pattern and degree of involvement of the forearm and hand determine the use of any one splint or combination of splints shown. Later in the treatment program splints which actively assist in functional performance may be necessary.

The question of when to discontinue the painstaking muscle reeducation and concentrate on increasing the functional capacity of the forearm and hand by any means available is an important one. Certainly, coordination must be established and the peak of individual muscle strength obtained. A

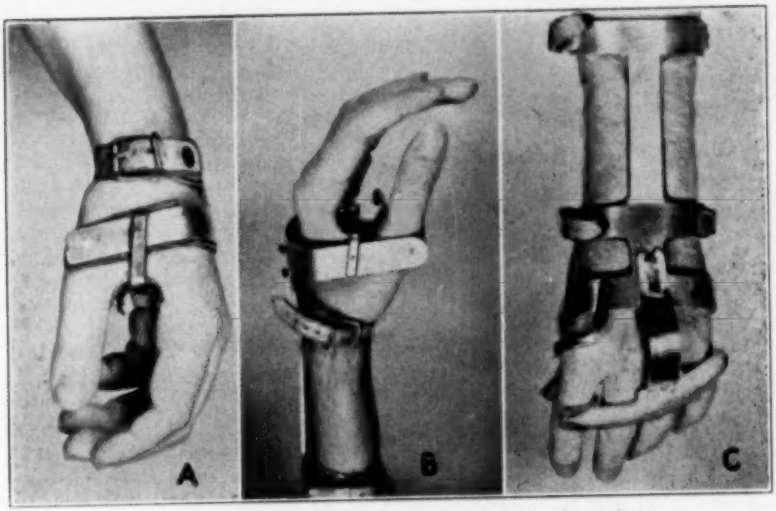


Fig. 2. — *A*, basic opponens splint. *B*, opponens splint with wrist attachment. *C*, opponens splint with wrist attachment and lumbricales attachment.

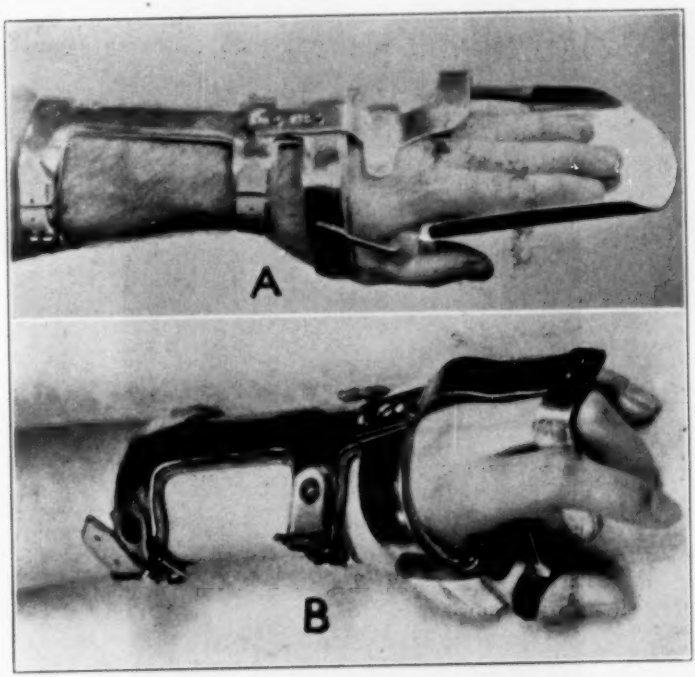


Fig. 3. — *A*, opponens splint with wrist attachment and platform attachment. *B*, opponens splint with wrist attachment and first dorsal interosseus attachment.

Fig. 4. — Assistive opponens splint (rubber band not shown).

plateau in the periodic muscle tests will readily reveal that maximum muscle strength (compatible with central nervous system involvement) has been reached in this treatment regimen.

Before a specific program of functional training can be instituted, a complete evaluation of the functional capacity must be determined. The basic movements of the forearm and hand may be broken down into (1) pronation

Fig. 5. — Suspension feeder.

and/or supination of the hand; (2) flexion and/or extension of the wrist; (3) radial and/or ulnar deviation of the wrist; (4) gross opposition and/or retraction of finger and/or thumb, and (5) fine opposition and/or retraction of finger and/or thumb. A functional test based on these movements will determine the activities necessary for the patient to achieve independence. Bennett and Stephens[1] have stressed the need for and the place of functional testing and training in an over-all convalescent poliomyelitis program. In perusing the list of items necessary for over-all independence of the patient, it is seen that the forearm and hand plays a very prominent part. In this program the combined skill of physical therapy, occupational therapy and recreational therapy is employed to achieve maximum strength, endurance and skill necessary for independence. Many patients will require the assistance of some type of apparatus as dictated by the degree and type of involvement.

A patient with moderate involvement of the intrinsics of the thumb may need only a simple opponens splint to carry out activities in a normal man-

Fig. 6. — Stand feeder.

ner. This splint may be discarded with improvement or by surgical intervention. In other cases an assistive opponens splint (fig. 4) may be necessary for functional independence. Some patients with severe involvement of the intrinsics of the thumb have been able to carry out activities adequately with only the long extensor, long abductor and short flexor functioning. This is true only in the cases in which the mobility of the first metacarpal has been maintained by adequate stretching of the adductor. Of course, this

1. Bennett, R. L., and Stephens, H. R.: Functional Testing and Training: Physical Therapy Aspects, Phys. Therapy Rev. 29:99 (March) 1949.

is a pattern of substitution and is allowed only in the late stage of convalescence when all hope of further return has been abandoned. Patients with involvement of weak flexors or weak extensors of the fingers may achieve a functional status with a little assistance.

In many cases the involvement is so severe that specially designed apparatus is necessary for any functional activity. Patients with completely flail upper extremities have been taught to feed themselves with the use of such apparatus as shown in the figures 5 and 6 and the patient shown in figure 5 is able to bring his hand to his mouth by shifting his body position slightly. By means of an overhead sling and suspension feeder as shown, sufficient force is transmitted to depress the elbow and raise the hand. The forearm and hand are stabilized in the functional position, and the spoon (or fork) is attached to the fingers by rings. A swivel is incorporated in the spoon (or fork) to prevent spilling of the contents. The dish shown in this illustration is square and enables the patient to "corner" the food. The mechanism illustrated allows the patient to rotate the dish by merely abducting his thigh.

In a less severely involved patient, a stand feeder (fig. 6) may be used. This, however, limits the range of motion when compared with the suspension feeder.

Among the variety of special equipment we have used various typewriters designed for the handicapped. The ordinary typewriter requires 1 to 2 pounds of pressure for depressing a key. Electronic typewriters are available which require 2½ to 3 ounces, and the remote control typewriter requires only 3 ounces. A one-hand typewriter has been designed, and its usefulness is readily apparent. The keyboards have been specifically designed for either the right or the left hand. In our group of patients, speed and accuracy on these machines have approached that on the ordinary typewriter.

The preceding discussion is only a guide as to what may be done to achieve the greatest functional capacity allowed by the central nervous system involvement.

## Deformities of Functional Importance

The commonest deformity of the forearm is the pronation contracture. Fortunately, most activities are performed with the forearm in slight pronation, and this is the position of choice if for any reason a contracture is permitted to exist. However, every effort should be made to gain and maintain as much supination as possible. Activities such as opening doors, winding a clock, brushing the teeth and combing the hair are executed with difficulty if there is marked limitation.

Flexion and ulnar deviation deformity of the wrist places the hand at a great mechanical disadvantage when it is realized that the grasp is strongest with the wrist in slight dorsiflexion.

Adduction and external rotation of the first metacarpal and flexion of the metacarpophalangeal joint are caused by the persistent and unopposed pull of the extensors and adductor of the thumb against the weakened thenar group. Obviously, with the thumb held in this position the functional capacity of the hand is severely curtailed.

Hyperextension of the metacarpophalangeal joints, as beautifully demonstrated in the clawhand is extremely disabling. The fingers are allowed flexion only at the interphalangeal joints and as a consequence cannot assume any functional position. With the usually accompanying "cock-up" thumb, no grasp is possible and the hand is functionally useless.

### Relationship of Physical Medicine to Orthopedic Surgery

A discussion of surgical procedure is beyond the scope of this paper. However, it should be remembered that the surgical results are greatly influenced by the caliber of early conservative care. Prevention or minimization of deformities and attainment of maximum coordination and strength will make surgery easier to perform and will facilitate the functional capacity. Surgery should not be considered the final step in the treatment program. Rather, it should be considered another step in the over-all program; its timing should be dictated by the necessity of increasing functional activities and not in any specific chronological phase of the treatment.

In the treatment of other segments of the body, surgery is often indicated early to control deforming factors. This is not such a great problem in respect to the forearm and hand, and surgery is usually an elective procedure.

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## CONTRAINDICATIONS FOR PHYSICAL MEDICINE IN NEUROLOGICAL CONDITIONS *

WALTER FREEMAN, M.D., Ph.D.

WASHINGTON, D. C.

Remarkable results in the rehabilitation of patients with neurological disorders have been accomplished during the past few years by means of physical medicine. The accomplishments of specialists in physiatry have gone so far beyond the pioneering efforts of neurologists of the classic school as to leave them gaping in open-mouth wonder. This is particularly true in regard to the paraplegic patients. It is not in regard to the accomplishments of physical medicine in neurological conditions that this paper is directed, however, since there is evidence on every hand that these accomplishments are magnificent. I propose to discuss some of the shortcomings and the possible dangers of the use of physical medicine in the treatment of neurological disorders. Perhaps some of these objections have already been recognized and accounted for or corrected by physiatrists, and perhaps some of the recent accomplishments have overcome the objections of the classic neurologist. It must be admitted that there is a certain jealousy on the part of the neurologist at seeing a considerable part of his field of effort being taken over by the specialist in physical medicine. If so, it is an indication of the mental ossification of the neurologist, who has demonstrated his inability to keep up with recent advances in rehabilitation. This is far from a unique experience, however, since the pioneering efforts of the neurologist have often resulted in the development of fundamental technics that could then be entrusted to physicians in related fields. I need cite only the treatment of such conditions as acute meningitis, neurosyphilis and epilepsy. Neurologists used to handle most of these cases, but the development of the sulfonamides, the antibiotics and the anticonvulsive remedies have brought these and many similar disorders within the therapeutic capacity of the

* From the Department of Neurology and Neurological Surgery, George Washington University School of Medicine.

* Read before the Eastern Section, American Congress of Physical Medicine, Washington, D. C., April 29, 1950.

general practitioner and especially the pediatrician. The neurologist still has plenty of problems on his hands, however, and he greets every advance in the field.

The neurologist is inclined to be skeptical. This is particularly true if he has served an apprenticeship in neuropathology and knows how easily the cells of the nervous system can be damaged beyond repaid by various adverse influences. A thrombus in the anterior choroidal artery catches the pyramidal tract where it is concentrated in a small band of fibers near the base of the brain and throws out of function the whole voluntary control of the muscles of the opposite extremities. Infarction of the parietal lobe abolishes kinesthetic perception and prevents the person from recognizing the position of the hand or even from recognizing that he has a hand at all. The progressive destruction of the substantia nigra in parkinsonism makes him pessimistic about the possibility of substituting some other mechanisms to overcome the rigidity and tremor that are characteristic of this disorder. And when he examines the spinal cord of a patient with multiple sclerosis with its disseminated plaques of demyelinization, he wonders how it is possible for the patient to function adequately. The skepticism, however, should not necessarily lead to pessimism and to therapeutic nihilism. The characteristics of the nervous system in compensating for the loss of particular functions should make for optimism. In some cases there seems to be practically no limit to the possibilities of restoration, although the particular goals may have to be altered.

There are very few strictly neurologic contraindications to the use of physical medicine, and many of these are being avoided by more judicious application of remedies. The use of the galvanic current in the treatment of facial paralysis has been largely given up because it was shown that active and persistent stimulation of the paralyzed muscles led to deformity through contracture and rendered likely a greater degree of asymmetry when the facial nerve finally grew in to take over its normal function. In the same way it has been proved ineffective to stimulate the fatigued muscles in myasthenia gravis to greater efforts, when the trouble was found to lie in the humoral mechanism for transmission of the nerve impulse to the muscle. More effective means were found in the administration of neostigmine (Prostigmin), ephedrine and other remedies that would correct the faulty metabolic activity. It must be taken for granted that the patient with myasthenia gravis will carry out to the limit of his capacity the various activities that he is able to do, and the physiatrist should avoid forcing him beyond this capacity. The same objection holds true in the physiological antithesis of myasthenia, namely, in myotonia congenita, in which the condition of the "muscle-bound" patient will be improved by the administration of quinine. Actually, the only reason that these disorders are considered among neurological conditions is that the patients are referred to the neurologist by the puzzled physician because there is something queer about them. Actually there is no evidence of intrinsic disease of the nervous system in either myasthenia or myotonia. The trouble lies outside the nervous system. It is hardly necessary to stress the uselessness and possible harm that may result from concentration on procedures of rehabilitation that cause the specialist in physical medicine to overlook a grave and advancing condition in the nervous system, such as a tumor. But this happens to all sorts of specialists, and neuropsychiatrists are far from immune to such egregious blunders. Many a patient has been treated for a supposed neurotic complaint by psychotherapy who later has been found to be suffering from a brain tumor.

The contraindications to physical medicine in neurological disorders are found to lie chiefly in the psychic field. Some of these contraindications can be overcome by proper approach and preparation, but not all. Moreover the family setting is worthy of study before an active program of rehabilitation is undertaken. And finally the frustrating effect of physical therapy in the face of an advancing disability should be taken into account as far as the morale of the physiatrist and of his associates is concerned.

### The Psychic Field

Here is a patient who has been told by his physician that he has an incurable disease and can never get well. That is a pretty discouraging verdict, however true it may be. Maybe the physician has said too much or too little. Maybe the patient has understood some statements but not others. The consequence, however, is that the patient responds to the bad news in a variety of ways, depending upon his psychological reactions to various frustrations in the past. He may resign himself to the inevitable and make his preparations for a life of invalidism, short or long as the case may be. He may, on the contrary, react with a depression that makes suicide the only logical solution. He may go in for faith cures or philosophy or religion and deny to himself and to others that there is anything wrong with him. The more realistic patient will reserve to himself a little doubt about the bad prognosis and proceed to seek a different opinion. Having heard about the superior results achieved by specialists in rehabilitation and urged by friends of patients who have recovered from different conditions by means of physical medicine, he is apt to seek treatment from those well qualified in the field. It seems quite reasonable that such a patient is a good candidate for rehabilitation, but this is the situation in which a good diagnostic and therapeutic background is of considerable importance to the physiatrist. He should know the patient as well as the disease, and should take cognizance of the family and friends as well as the patient. Otherwise there may be disappointment and hardship awaiting the patient and his associates. A few examples will suffice.

*Paralysis Agitans.* — This is a disorder due to destruction of the substantia nigra in the midbrain. It is progressive, although at varying rates in different persons. It is characterized by rigidity and tremor in varying proportions and in various limbs. There is no cure for it, although drugs like Artane and Panparnit are useful, as well as the drugs of the belladonna series also Benadryl and Amphetamine. Physical therapy has long been employed in the treatment of the disease, especially massage and passive movement, but almost as soon as the individual treatment is over the patient slumps from the erect posture and tightens up or begins trembling. If the patient has come to expect a miracle from the treatment, he comes to place too much reliance upon the therapist, concentrates his attention upon the treatment and yields a certain initiative which hitherto has been the main source of his independence. Since the physiatrist can accomplish little in the elimination of rigidity and tremor, it behooves him to foster in the patient whatever is left of his ability to do his job without concentrating his attention upon his disability. Many persons with paralysis agitans are barely able to make the effort to get out of their chairs or their homes in order to undertake treatment. Their small reserves of energy in the later stages of the disease make the treatment a hardship rather than a benefit. The physiatrist should estimate the benefits to be derived from treatment before coming to the actual physical measures applied.

*Amyotrophic Lateral Sclerosis.* — This is a progressive disease terminating fatally in about two years in which the motor cells of the spinal cord shrink and disappear. Frequently the medullary nuclei are also affected, with the development of bulbar palsy. The condition can be easily recognized by wasted fasciculating muscles with increased reflexes. Various measures, both medical and surgical, have been applied without altering the course of this distressing disease. Stimulation of muscles by active and passive movement, or by electricity, has little effect, although it is doubtful whether such exercise actually hastens the progress of the disease. The hopeful attitude of the patient undergoing physical therapy for an inexorably progressive disease soon gives way to despondency as he observes the withering of the muscles unchecked by treatment. The expense of treatment should enter into the calculations of the physician who is considering physical therapy in this and in similar hopeless conditions. It would be better to conserve funds for the education and establishment of the children rather than to expend them in a misguided effort to delay the inevitable.

*Multiple Sclerosis.* — This is an organic disease of the central nervous system characterized by scattered and confluent plaques of demyelination. It is a common disorder in the northern parts of the country and seldom seen in the deep South. The cause is unknown, but relapses and remissions are the rule. Prolonged recoveries are encountered, sometimes extending over decades. Each relapse, however, is apt to cause added disability. In remissions there is considerable return of function, far more than would appear to be possible from the extent of the demyelination. The important part of management of a patient with multiple sclerosis is the control of the spread of the disease. Medicines are of help only in combating complications; hence the main reliance is upon rest and climate. In this respect, the treatment of multiple sclerosis falls in the same category as that of active tuberculosis. Things to avoid are acute respiratory infections, overactivity and exhaustion. The psychological aspects of multiple sclerosis have been described many times. I have used the phrase: "spends his life gaily in a wheel chair." The euphoria in multiple sclerosis is not constant, but it is deceptive in two respects. It makes it unnecessary for the patient to exert himself, once the activity of the process has died down, and it exaggerates the benefits that occur from any method of treatment. The patient is always certain that he is improving. In the absence of exacerbations of the disease, this is usually true, and the patient may need to be restrained from overactivity rather than stimulated to undertake new efforts. Perhaps the best rule is to be reasonably certain that the disease is quiescent and then to proceed gently with physical methods to encourage the patient to make use of his returning functions. At the same time it is better to direct the patient toward the goal of useful activities than merely to emphasize the employment of certain tricks of movement. If the patient cannot resume walking he may, like Wilford Wright, get around on a tricycle. A great deal depends upon his interest in things outside himself.

In general it may be said that when a disease process is stationary, physical methods are useful and necessary in helping the patient to overcome the residual disability, but when the process is advancing the psychological effects of failure are embarrassing to the therapist and disheartening to the patient and to the family.

## The Family Setting

Some families take a gloomy pride in devoting themselves continually and wholeheartedly to the care of a chronic invalid. They wear themselves

and others down in their assiduous attentions to the sufferer. This situation is more often met with in the case of aged persons and is compounded of a mixture of pity and guilt that makes for an unhealthy domestic situation. The invalid often has an uncanny knack of finding the weak spots in the armor of the devoted ones and of making them feel their duty to him with more than ordinary intensity. Actually, in many cases, the family needs the invalid as much as the invalid needs the family, and if the patient is removed through death or hospitalization the family disintegrates. Usually when the question of physical therapy for a patient with disabling neurological disorder comes up, a consideration of the family becomes desirable. In the first place, it might well be asked whether the time and effort expended upon the patient will spur the flagging efforts of the family to participate in the rehabilitation of the patient, or whether, on the other hand, the family is merely turning to the physiatrist in the hope that he will relieve them of their responsibility and make it no longer necessary for them to exhaust themselves caring for a fractious individual. Then they can say that they have done everything possible, and in doing so they shift the responsibility for lack of progress from their own shoulders to that of the physician. The matter of expense also enters into the situation, since it is poor economy to sacrifice the opportunities for education and advancement of the children for the sake of dubious returns in the face of severe neurological disability. In the competitive civilization of the present, the handicap of an invalid may make all the difference between success and mediocrity. I recently visited a family of congenital paraplegics on a sandy farm in Georgia. One healthy woman and her nephew were pushing four wheel chairs. Here were two persons doing the work of two persons but carrying on themselves the burden of four ultimate consumers. Fortunately, the healthy ones were able to carry on without state assistance. But a program of physical therapy would have been entirely out of place in this setting. In the rather delicate equilibrium attained by this family, any factor introduced from the outside might have disturbed more than their serenity.

## The Physiatrist

Physicians like to see patients get well and handle themselves. It restores their faith in the capacity of the human individual to function adequately in society. Therefore, if the physician is devoting himself too much to the hopeless case, he acquires a certain state of mind that overlooks possibilities of more effective work in other directions. This does not mean that the physiatrist should undertake treatment only in those cases in which superior results might be expected. This is an unrealistic approach, just as unrealistic as that which concentrates in obsessive fashion upon the utterly hopeless cases. Fortunately, physicians have a certain healthy optimism and tolerance of frustration. They do need success, however, to stimulate them to greater efforts at rehabilitation. And this goes also for their associates in physical therapy, the technicians and nurses. Serenity of the spirit comes from recognition of limitations balanced with desire to improve conditions. The physiatrist, among the newest of the specialists, comes to the task of the neglected, the lame and the halt with an enthusiasm that has been developed particularly as the result of contact with war casualties who have overcome severe handicaps under his professional guidance. In order to maintain that enthusiasm and thereby be of benefit to his future patients, he may well observe certain rules in the acceptance of patients for rehabilitation procedures. First and foremost, he is a physician and is therefore dealing with

people, living people, hampered in some way by disease of the nervous system from carrying out their daily activities. These people are acting, thinking, hoping and fearing people, and the physician's role is one of directing them, as people, into the most effective way of living. Secondly, these people are parts of families and parts of the society in which he himself lives, and therefore the family and the society are both to be considered in his efforts at improvement. It is no kindness to attempt to relieve a patient of an incurable disability if the family thereby is rendered less stable, efficient and harmonious. Finally, the physician, in order to keep himself at a high pitch of enthusiasm, has to see satisfactory results of his treatment. Selection of proper cases for physical medicine is the surest way of establishing a proper foundation for specialized work, and this requires consideration of the background of the patient, his psychological panel. There are few contraindications to physical medicine that occur directly in the disease process itself. The contraindications are psychic rather than physical.

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# POSITION OF THE ARM IN SPASTIC HEMIPLEGIA

LEONARD J. YAMSHON, M.D.

LOS ANGELES

The treatment of the arm of the patient with spastic hemiplegia presents a difficult problem. In order to prescribe treatment intelligently, it is first necessary to understand the general picture and its pathological and physiological basis.

One commonly finds the arm held internally rotated and adducted at the shoulder, flexed at the elbow, the forearm pronated and the wrist and fingers flexed. Muscular tone in the arm flexors is increased. Muscular atrophy is present, particularly in the extensor muscles of the digits, wrist and elbow and in the abductors of the shoulders. There is a decrease in voluntary or willed movements. Diminished sensory perception may be present.

In referring to the position of the arm in hemiplegia, it has been stated that the upper limb possesses a primary inherent function, that of embrace, grasping and carrying food to the mouth. This was considered as analogous to postural functional conditions and due to a reflex system involving muscles besides those maintaining reflex tone, and the result of loss of cerebral control.[1] Another author placed it on a phylogenetic basis[2] and described the arm position as similar to the attitudes seen in resting anthropoid apes, monkeys and other animals which rear up on their hind legs. Animal experiments[3] revealed the tone occurring in the antigravity muscles — that this tone was reflex and was a postural reaction which could be modified by afferent stimuli. These animal experiments showed that posture itself was reflex and that reciprocal innervation held true in postural reflexes. The

1. Walshe, F. M. R.: On the Genesis and Physiological Significance of Spasticity and Other Disorders of Motor Innervation, with a Consideration of the Functional Relationships of the Pyramidal System, Brain 42:1, 1919.

2. Brain, W. R.: On the Significance of the Flexor Posture of the Upper Limb in Hemiplegia, with an Account of a Quadruple Extensor Reflex, Brain 50:113, 1927.

3. Sherrington, C. S.: Postural Activity of Muscles and Nerve, Brain 38:191, 1915.

influence of postural reflexes as the tonic neck reflex and labyrinthine reflexes on tone have been demonstrated in animals[4] and in man.[5]

Sherrington[6] noted that if the afferent nerves of the limb were severed the limb failed to retain the standing posture. He found that it was not the skin receptors but the muscle receptors themselves which were responsible for the maintaining of tone and that if the muscle receptors were severed reflex posture disappeared, even if the efferent nerves and skin receptors were intact. He also found that the ability of a receptor is selective and the stimulus must be adequate. "The proprioceptive nervous arc of the muscle reacts to the passive stretched posture imposed upon the muscle and its action results in the production and maintenance in the muscle of an active contraction posture which opposes the passive stretch to which the muscle is subjected."

When Brain described the quadrupedal reflex, he found that when a patient, while standing or kneeling, bends forward so that the hip and back extensors are no longer able to support the trunk the arm becomes flexed at the shoulder and the elbow extends. If weight is allowed to bear on the extended limb, the wrist may extend and the arm may become so rigid it cannot be passively flexed. In the supine position, he stated, the flexion of the hips and the spine evoke extension of the arm only when the head position is such as is naturally associated with the quadrupedal posture. He believed "the extensor posture of the affected upper limb is evoked by flexion of the hips and spine associated with lengthening of the extensor muscles of the hips and the erector spine, while the flexor posture is elicited by extension of the hips and the spine brought about by shortening of the muscles."[7]

During the evaluation of the tonic neck reflex,[5d] it was noted that elbow extension could best be obtained when the arm was elevated to 90 degrees. At that time it was stated to be due to the favorable position of the deltoid and to the synergistic action of the deltoid and triceps. The strength of the movement increased when the tonic neck reflex was superimposed on the position of the arm.

Spasticity in the muscles of the arm is influenced primarily by the position of that arm. It can be demonstrated that the spasticity can shift from the flexors to the extensors, when the relationship to each other of the muscles around the shoulder girdle is altered. All other reflex influences, in hemiplegic man at least, are superimposed upon this primary postural pattern. When the arm is at the side, the increased tone is found in the flexors. If the arm is elevated to 90 degrees or above, it can be noted that the tone will shift from the flexors to the extensors. The quadrupedal position is not necessary to bring about this change in tone. It can be elicited when the body is in any position. The influence of the postural reflexes can influence the tone but do not eliminate it. The increased tone in the extensors can be elicited even when the neck and labyrinthine reflexes are operating against it.

If one attempts to flex the extended forearm passively when the arm is not elevated, it will be found that there is little resistance to the movement. If

4. Magnus, R.: Korpustellung, Berlin, Springer-Verlag, 1924.

5. Magnus, R., and de Kleijn, A.: Weitere Beobachtungen Über Hals und Labyrinthereflexe auf Gliedermuskeln des Menschen, Pflugers Arch. f. d. ges. Physiol. **169**:429, 1918. (*a*) Davis, L. E.: Decerebrate Rigidity in Man, Arch. Neurol. & Psychiat. **13**:569, 1925. (*b*) Walshe, F. M. R.: The Decerebrate Rigidity of Sherrington in Man, ibid. **10**:1, 1923; (*c*) On Certain Tonic or Postural Reflexes in Hemiplegia, with Special Reference to the So-Called "Associated Movements," Brain **46**:1, 1923. (*d*) Yamshon, L. J.; Machek, O., and Covalt, D. A.: The Tonic Neck Reflex in the Hemiplegic: An Objective Study of Its Therapeutic Implication, Arch. Phys. Med. **30**:706, 1949. (*e*) Covalt, D. A.; Yamshon, L. J., and Nowicki, V.: Physiological Aid to the Functional Training of the Hemiplegic Arm, Am. J. Occup. Therapy, Nov.-Dec., 1949.

6. Sherrington, C. S.: Problems of Muscular Receptivity, Nature, London **113**:493, 1924.

one tries to extend the flexed forearm passively when the arm is in the same position, there will be increased resistance. When the arm is elevated and the same passive motions are attempted, resistance will be in the reverse motions. This resistance will be greater to flexion and less to extension. This holds true for any position of the body or head in space.

If a patient is capable of elevating his arm above his head, it will be noted that, even if the elbow is slightly bent, the forearm is being held against both gravity and any pull by the flexors which might be present. If, while the arm is in this position, a stimulus such as a weight placed in the hand, is added, the extensors will respond by further extension. Further, when the arm is slowly lowered, extension of the forearm will be retained until the arm is at right angles to the body, at which point the arm will begin to flex.

It is apparent that the position of the arm in spastic hemiplegia is a postural reflex. The fact that the pattern of increased tone changes from the flexors to the extensors when the arm is raised cephalad to a 90 degree angle with the trunk and that this pattern is not basically changed by reflex influences from other levels in the central nervous system indicates that the reflex is locally confined to the involved segments. Sherrington[6] showed that the proprioceptive stimulus was initiated in the hypertonic muscle itself. It is reasonable to conclude that the pattern of spasticity is locally proprioceptive, is reflex and is the direct result of the postural position relationship of the muscles of the shoulder girdle to each other.

Atrophy of disuse may interfere with the obtaining of this reflex pattern. If the extensor muscles are strengthened by electrical contraction and by resistive exercise, with reinforcement by other reflexes, such as the tonic neck reflex, the weakness due to disuse is overcome. With the return of strength it becomes possible to exert some voluntary control over the position of the arm, even when it is in the dependent position. This is true for gross movements.

Observations to date reveal that by equalizing the strength between the arm flexors and extensors voluntary control can be obtained over the elbow, to a less degree over the wrist and to an even less degree over the digits.

## Conclusions

Increased tone in the muscles of the arm in patients with spastic hemiplegia is postural in nature. The increased tone can be shifted from the flexors, internal rotators and adductors to the extensors and abductors by elevating the arm 90 degrees. The exciting stimulus is proprioceptive in origin, and the pattern of extension or flexion is probably determined by the relationship to one another of the muscles around the shoulder girdle. This basic pattern can be modified but not altered by reflexes from other levels. Atrophy of disuse can be corrected and some voluntary control over gross movements obtained.

ARCHIVES of PHYSICAL MEDICINE

OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL MEDICINE

# .·. EDITORIALS .·.

## NOTICE TO CONGRESS MEMBERS

Please take notice that Section 3, Chapter 1, "Dues and Assessments" of the By-Laws of the American Congress of Physical Medicine reads in part as follows: "Membership dues in the Congress shall be payable January 1 annually and shall be in such sum as the Board of Governors shall determine, provided that notice of the Board's determination of dues for the ensuing year shall be published in either the October or November issue of the ARCHIVES OF PHYSICAL MEDICINE. The dues so determined by the Board shall be net dues accruing to the Congress and shall be transmitted to the Congress regardless of the amount of dues that may be collected by a society affiliated with the Congress in accordance with any arrangement that may be entered into between the Congress and the affiliated society for the collection and transmission of dues."

In accordance with this amendment the Board of Governors set the amount of dues for 1951 as Fifteen Dollars ($15.00).

## THE BOSTON MEETING

American history was made less than two hundred years ago in the city of Boston and history for the American Congress of Physical Medicine was made in this same city from August 28th to September 1st. The twenty-eighth annual scientific and clinical session of the American Congress will long be remembered as one of the most successful from every point of view.

Each year has seen a definite improvement in quality of the scientific papers. This year's presentations continued in that trend. As in the past, two scientific sessions were held in the morning and one in the afternoon. Various symposia were held on such subjects as electromyography, physiology, ultrasonics, hydrotherapy, rehabilitation and cerebral palsy. A particularly provocative one was that on occupational therapy. This was held in the large ballroom which could not accommodate all those who wished to attend. It was the papers of Drs. Snow, Molander and Mead which caused the most comment. Their papers were most stimulating and point to a genuine and sound interest by these men in physical medicine in occupational therapy. It is encouraging to have these opinions expressed, and such frank discussion cannot help but bring about a better appreciation and a more extensive use of occupational therapy. In addition to this symposium, three papers on braces completed this afternoon's program. They were by Drs. Wright, Bennett and von Werssowetz. All are outstanding physiatrists who are also authorities on braces, a subject which is gradually assuming greater importance in physical medicine.

The formal opening session had numerous highlights. The most outstanding was the induction address of the new president, Dr. Arthur L.

Watkins which is the first article in this issue of the ARCHIVES. The accumulation of this large amount of interesting information about the preceding presidents of the American Congress, which must have taken a tremendous amount of effort, is skillfully employed to bring out the full significance of the "Boundaries of Physical Medicine." This is a most scholarly paper—adeptly conceived and beautifully done.

Practically every paper could be singled out for particular comment and commendation. It is unfortunate that those who were unable to attend this meeting will be forced to wait months before they can agree to the excellence of these papers by reading them in the ARCHIVES.

The instruction seminars continue to attract an ever increasing number of physicians and therapists. The lectures on the more basic subjects afford a unique opportunity of learning about the most recent developments in the allied sciences and their integration with physical medicine. For example, this year, the subject of the neuroanatomy of the brain and spinal cord was presented by Dr. Corbin of the Mayo Clinic; and, on that same day, Dr. Karnosh of the Cleveland Clinic spoke on pathologic physiology of the lesions of the brain and spinal cord. In competition to these lecturers were Drs. Polley and Clark speaking on the new hormonal treatments of rheumatoid arthritis and Dr. Rae on the clinical use of microwave. This latter group represents the series of lectures on the clinical subjects which supply knowledge of a more technical and clinical nature as related to physical medicine. These are the subjects and speakers for the first day's seminars. The subsequent three days were equally as good. Is it any wonder that a physician finds it difficult to choose which lecture he should attend?

The scientific exhibits were well displayed and attended. The demonstrators were kept busy explaining and showing their exhibits. A noticeable feature of this year at most of the exhibits was the presence throughout the day of the principal exhibitor or a member of his staff, eager and anxious to answer all questions. These persons not only worked hard in preparing these exhibits but worked equally as hard during the week of the convention. They supply intimate and valuable postgraduate courses in themselves.

The local committee, headed by Dr. Sidney Licht, supplied a service which added to the pleasure of the week in Boston. Every registrant of the convention was given a large envelope containing information on everything in and about Boston. Someone was available at all times to supply information on points of interest and what to do about it. The enthusiasm and willingness to serve of this committee, as best exemplified by its leader, was most gratifying.

The 28th annual meeting will certainly by recorded as one of the most notable, because of the exceptionally high standard of the presentations at the scientific sessions, the educational and practical value of the scientific and technical exhibits, the large attendance and the moments of pleasure and relaxation which only Boston can supply. The only failing of the meeting was the absence of our genial and exhilarating Secretary, Dr. Richard Kovács who was kept in New York due to illness.

The gratitude and appreciation of all members of the American Congress are due to Dr. Walter J. Zeiter, Executive Director and Miss Marion G. Smith, Executive Secretary who by their indefatigable energy and most capable management make such a meeting a well remembered achievement.

W. M. S.

## AWARDS OF MERIT BY THE AMERICAN CONGRESS OF PHYSICAL MEDICINE FOR THE YEAR 1950

The Committee on Gold Key Awards announced through its Chairman, Dr. Walter M. Solomon, the following recipients:

SVEND CLEMMESEN, distinguished son of Denmark, in recognition of his leadership and inspiration which has led to the establishment, appreciation and extensive utilization of Physical Medicine in the Scandinavian countries.

KRISTIAN G. HANSSON, distinguished son of New York, in recognition of his contributions to the study of neuromuscular functions and to the scientific and comprehensive management of such disorders.

HARRY M. HINES, distinguished son of Iowa, in recognition of his physiologic studies of the peripheral circulation and its alteration by various physical measures.

## AWARDS TO SCIENTIFIC EXHIBITORS

The Committee on Awards for Scientific Exhibits presented through its Chairman, Dr. Robert W. Boyle, the following:

Bronze Medal to Kurt S. Lion, Ph.D., for his exhibit of a Plethysmograph.

Silver Medal to National Foundation for Infantile Paralysis for the exhibit, "Therapeutic Exercise in Pools and Tanks."

Gold Medal to H. Worley Kendell, M.D.; Arthur A. Rodriquez, M.D.; James L. Murphy, B.S., and Hilary W. Pavela, B.S., for the exhibit, "Researches in Electromyology and Analysis."

# MEDICAL NEWS

### American Congress of Physical Medicine Officers, 1951

**Arthur L. Watkins, M.D.**, Boston, President.

**Robert L. Bennett, M.D.**, Warm Springs, Ga., President-Elect.

**Walter M. Solomon, M.D.**, Cleveland, First Vice-President.

**William B. Snow, M.D.**, New York, N. Y., Second Vice-President.

**William D. Paul, M.D.**, Iowa City, Iowa, Third Vice-President.

**Howard A. Rusk, M.D.**, New York, N. Y., Fourth Vice-President.

**Gordon M. Martin, M.D.**, Rochester, Minn., Fifth Vice-President.

**Richard Kovács, M.D.**, New York, N. Y., Secretary.

**Frank H. Krusen, M.D.**, Rochester, Minn., Treasurer.

**Walter J. Zeiter, M.D.**, Cleveland, Executive Director.

**Marion G. Smith, B.S.**, Chicago, Executive Secretary.

### Other Officers Named for 1951

Dr. **George M. Piersol** of Philadelphia, Pa., was appointed to serve a term of six years on the Editorial Board of the *Archives of Physical Medicine*.

Dr. **Roy W. Fouts** of Omaha, Nebraska, was elected to succeed himself to serve a term of three years on the financial committee of the Congress.

Dr. **Shelby Gamble** of Cleveland, Ohio, was appointed to serve a term of seven years on the Board of the American Registry of Physical Therapists, beginning January 1, 1951.

Formal approval was voted for the appointment of Dr. **George M. Piersol** of Philadelphia, Pa., to serve out the unexpired term on the Board of the American Registry of Physical Therapists, which was created by the death of Dr. John S. Coulter.

## American Society of Physical Medicine Officers and Committees for 1951

President — **Miland E. Knapp**
President-Elect — **Frances Baker**
Vice-President — **Walter McClellan**
Secretary-Treasurer — **Max K. Newman**

### Board of Governors

Miland E. Knapp
Frances Baker
Walter McClellan
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### Membership Committee

Milton Schmitt
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### Nominating Committee

Ben L. Boynton
Nils Covalt
George Wilson

### Program Committee

Clarence Dail
Ben L. Boynton
Joseph McRae

## Report of Western Sectional Meeting of Congress

The meeting of the Western Section of the American Congress of Physical Medicine was held at the Letterman General Hospital in San Francisco on Sunday, June 25, 1950. This meeting was held on the day preceding the opening of the Annual Convention of the American Medical Association, consequently a good attendance was present. Judging from current comments of those attending the meeting, the scientific papers were well presented and well received. Following is a copy of the essentials of the program:

Frances Baker, M.D., Chairman.
Clarence W. Dail, M.D., Secretary.
"Principles of Muscle Dynamics" — H. J. Ralston, Ph.D.
"Principles of Muscular Action" — Verne T. Inman, M.D.
"Diagnostic Methods in Neuromuscular Disease" — Col. A. E. White.
1. "Use of the Electromyograph and Evaluation of Results."
2. "Use of the Neurodermometer, Evaluation of Results."
Discussants: James C. Golseth, M.D.; S. M. Durinson, M.D., and Verne T. Inman, M.D.

In addition a general discussion of the papers presented by Drs. Ralston and Inman was presented by Dr. O. L. Huddleston who emphasized the importance of the nervous system in considering muscle physiology as it exists in the normal human body. A demonstration of some of the important neurologic concepts and treatment procedures was presented by Dr. Huddleston, using a myoscope and an electromyograph.

## Tentative Program of the American Academy for Cerebral Palsy October 20-21, 1950

**Palmer House** **Chicago**

Friday, October 20, 1950 (Open to interested physicians)

2:00 P.M. The Cerebral Palsy Problem, 1950, by the President, Earl Carlson, M.D.
2:30 P.M. Pediatric Approach to the Cerebral Palsy Problem, Eric Denhoff, M.D.
3:00 P.M. Convulsive Disorders in Children with Cerebral Palsy, Frederic A. Gibbs, M.D.; M. A. Perlstein, M.D.
3:30 P.M. Development of Speech in Pre-School Age Children, Harold Westlake, Ph.D.
4:00 P.M. Testing Hearing of Cerebral Palsied Children, William Hardy, Ph.D.

Saturday, October 21, 1950 (Members only).

9:00 A.M. Revascularization of the Brain, Chas. F. McKhann, M.D.
9:30 A.M. Differential Points of Diagnosis Between True Idiocy and Mental Retardation in Cerebral Palsy as Shown by Pneumoencephalography, Temple Fay, M.D.
10:00 A.M. Use of Mesantoin in the Treatment of Convulsive Disorders in Children with Cerebral Palsy, Joseph Moore, M.D.
10:30 A.M. Mental Evaluation of Children with Brain Damage, Edgar A. Doll, Ph.D.
11:00 A.M. General Discussion.

## Convention Highlights National Society for Crippled Children and Adults October 26, 27, 28, 1950 (Thursday through Saturday)

**Stevens Hotel** **Chicago, Illinois**

Sessions:
Thursday: Morning — Keynote and panel of Distinguished Handicapped Persons.
Luncheon — For Professional groups:
Social Service — Physical Therapists
Recreation — Occupational Therapists
Easter Seals — Speech
Sheltered Workshop — Employment
Afternoon —
Research — Recruiting the Team
Friday: Morning — Accidents: The Nation's Greatest Crippler at home . . . at school . . . at work . . . at play
Rehabilitation Technics
Afternoon —
Building for Living
Architectural Features for the Handicapped
Film Theatre
President's Dinner
Saturday: Cerebral Palsy Day: Our Children As We See Them.
Parents' Panel — RH Factor
Scenes from Easter Seals at Work

"Search" — Premiere of new Cerebral Palsy Film

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|---|---|
| Presented by: | Authoritative Speakers |
| Demonstrations and Drama | Panel Discussions Films and Slides |

## New Manual Ready

Announcement is made of the completion of a three-year project to benefit the nation's estimated half million cerebral palsy victims through publication of a manual of Cerebral Palsy Equipment.

The manual is sponsored by the Zeta Tau Alpha fraternity and will be published by the National Society for Crippled Children and Adults.

The manual is available through the National Society for Crippled Children and Adults, 11 S. La Salle St., Chicago 3, Ill.

## Personals

Two public lectures on rehabilitation were given to the citizens of southern California during the month of June. The first was presented by Dr. Frank H. Krusen of the Mayo Clinic of Rochester, Minn., on Thursday, June 22nd, and the second by Dr. Howard Rusk and Dr. George Deaver on Friday, June 30th. There was a large attendance at the lectures and considerable interest in the topic discussed. A better understanding of the problems, objectives and achievements of rehabilitation was obtained by the audience. Dr. Krusen also talked on physical medicine and rehabilitation at one of the Veterans Administration hospitals. He also visited the Kabat-Kaiser Institute in Santa Monica and gave a lecture to the staff on his experiences during his recent lecture tour of Europe.

Dr. and Mrs. O. Leonard Huddleston visited Mexico, Guatemala, Cuba, Florida and Chicago on a combined vacation and clinical tour. They were accompanied by Dr. Dale Austin and Dr. Elizabeth Austin in Mexico. During the second week of July a series of lectures on muscle re-education, treatment of neuromuscular disorders, treatment of poliomyelitis at the Kabat-Kaiser Institute in Santa Monica, California, and on rehabilitation in the United States Army, clinic and demonstrations were held at the Orthopedic Hospital in Havana, Cuba. The lectures and demonstrations were presented at the Finlay Institute, the Army Hospital and the Orthopedic Hospital in Havana, Cuba.

Dr. Charles S. Wise has recently been promoted to professor of the department of physical medicine at George Washington University School of Medicine, Washington, D. C.

Dr. Louis B. Newman, Chief, Physical Medicine and Rehabilitation Service, Veterans Administration Hospital, Hines, Illinois, was guest speaker on September 11, 1950, in conjunction with the three-day Institute on Geriatric Nursing which was sponsored by the Loyola University Department of Nursing, Chicago, Illinois. Dr. Newman gave an illustrated lecture on "Physical Medicine and Rehabilitation of the Disabled."

## Apparatus Accepted

*Sanborn Viso-Cardiette, Model 51.* — Direct-writing portable electrocardiograph in which an electrically heated stylus traces on heat-sensitive plastic-coated paper. The Council on Physical Medicine and Rehabilitation voted to include the model in its list of accepted devices.

*DeVilbiss Steam Vaporizer, No. 149.* — The Council on Physical Medicine and Rehabilitation voted to include the apparatus in its list of accepted devices.

*Aerobalor (Powder Inhaler).* — Permits the administration of drugs, particularly antibiotics, by aspiration of the dust into nose or mouth. The Council on Physical Medicine and Rehabilitation voted to include the Aerobalor in its list of accepted devices.

*Grass Electroencephalograph, Model III-C.* — Instrument designed to record brain waves by direct-writing methods. The Council on Physical Medicine and Rehabilitation voted to include the model in its list of accepted devices.

*Croupette Humidity and Oxygen Tent.* — Designed for use in treatment of respiratory ailments where either high humidity or high oxygen concentrations, or both, are indicated. The Council on Physical Medicine and Rehabilitation voted to include the Croupette Humidity and Oxygen Tent in its list of accepted devices.

*Midwest All-Metal Humidifier, Model 100.* — The Council on Physical Medicine and Rehabilitation voted to include the apparatus in its accepted list.

## International Congress of Physical Medicine

Preliminary arrangements were made with Dr. Regina Castillo and friends to form a Latin-American Section of Physical Medicine and that the society, when formed, will send representatives to the International Congress of Physical Medicine in 1951.

## Announcement

A continuation course on poliomyelitis will be presented at the University of Minnesota Center for Continuation Study on November 9 to 11, 1950 with the sponsorship of the Elizabeth Kenny Institute. The course is intended for doctors of medicine engaged in general practice and for such specialists as pediatricians, physiatrists, orthopedic surgeons and neurologists. Dr. Harold A. Sofield, Associate Professor of the Department of Bone and Joint Surgery, Northwestern University Medical School, will be the visiting faculty member for the course.

## Ernest Stengel

We announce with regret the death of Ernest Stengel of New York City. Dr. Stengel was a Congress member for many years.

# BOOK REVIEWS

RADIOGRAPHIC ATLAS OF SKELETAL DEVELOPMENT OF THE HAND AND WRIST. Based on the Brush Foundation Study of Human Growth and Development initiated by *T. Wingate Todd*, M.B., Ch.B., F.R.C.S. Late Henry Willson Payne, Professor of Anatomy in Western Reserve University School of Medicine. *William Walter Greulich*, M.A., Ph.D. Professor of Anatomy, Stanford University School of Medicine; Formerly, Professor of Physical Anthropology and Anatomy and Director of the Brush Foundation, Western Reserve University School of Medicine. *S. Idell Pyle*, M.S. Research Associate, Brush Foundation and Department of Anatomy, Western Reserve University School of Medicine. Fabrikoid. Price, $10.00. Pp. 190 with illustrations. Stanford University Press, Stanford, California, 1950.

This work is a continuation of the study originally begun by Dr. T. Wingate Todd in 1929 on human growth and development. Children were chosen from three months to fourteen years of age and examined at regular intervals thereafter. At each examination the child was measured and weighed, x-ray films were made of the left shoulder, elbow, hand, hip, knee and foot; psychometric and other psychologic tests were administered; and a health history covering the period since the previous examination was obtained from the parents and the family physician. In the study 1,000 children were examined and the hand films from this series were used to prepare the atlas.

The book is divided into four sections. The first section is entitled "The Rationale and Technique of Assessing the Developmental Status of Children from Roentgenograms of the Hand and Wrist." In this part the method of study is considered showing its possibilities and limitations, the relationship of the developmental status of the skeleton to such factors as precocious puberty, hypogenital status and the effects of illness. Section two and three are labeled Male Standards and Female Standards. Each section includes 28 individual plates of roentgenograms of the hand and wrist together with descriptions beginning with the newborn and continuing at regular intervals up to eighteen years of age. These show the rate of skeletal development of the two sexes which brings out the greater precocity of the female skeletal growth. The fourth section, "Maturity Indicators of Individual Bones and Epiphyses" describes with words and schematic drawings the principal changes which occur in the shape of the various bones and epiphyses of the hand and wrist during their postnatal development.

The amount of work, energy and imagination that culminated in the preparation of this book is tremendous. Such a study supplies information not available by other means; for example it is possible to measure the progress of the child toward physical maturity, to determine any imbalance that may exist in skeletal formation or to assess any other changes.

The book is beautifully prepared. The reproductions of the roentgenograms are the same size as the original films. They are exceptionally clear so that the detailed alterations are readily detected. This is the type of book that supplies original information which will increase in value with the years.

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ESSENTIALS OF ORTHOPAEDICS. By *Philip Wiles*, M.S., F.R.C.S., F.A.C.S., Consulting Orthopaedic Surgeon, Royal Surrey County Hospital, Surrey, England. Cloth. Price, $10.00. Pp. 486, with 372 illustrations. The Blakiston Company, Division of Doubleday & Company, Inc., 1012 Walnut St., Philadelphia 5; J. & A. Churchill, Ltd., 104 Gloucester Place, Portman Sq., London, W.1, 1949.

Here is a new book on orthopedics and a most welcome one. Practically all the diseases of the bones and joints are covered in a regional manner. Separate chapters are devoted to such subjects as postural defects, back pain, tuberculosis, tumors, arthritis, diseases and congenital defects of bone, and diseases of the nervous system where such disorders as poliomyelitis, cerebral palsy, hemiplegia, ataxias and obstetrical paralysis are considered.

The title of the book aptly describes the manner in which the various topics are discussed including a description of the usual clinical picture, the pathological findings and the treatment in a brief and noncontroversial manner. As to treatment the author selects the conservative measures wisely and judiciously and supplies enough general information as to the operative procedures to be helpful. Physical Medicine is referred to frequently with evidence of intelligent use.

The style of writing is most readable and understandable, a quality which is often characteristic of the British. For example, in considering the etiology for scoliosis, Wiles discounts the blame for a badly designed desk by saying, "it is difficult to believe that such factors are of great importance, a child who is going to sit badly will do so at any desk and it would be far more rational to blame a boring lesson which fails to hold attention"; in the treatment of rheumatoid arthritis, "rest for both body and mind is the first essential but economic conditions make this perhaps the hardest of all therapeutic measures. Mere abstention from work, is not synonymous with rest and ideally there should be the right environment and freedom from all financial, domestic and social worries!" and in describing the term "tennis elbow" he says "this blunderbuss name is commonly applied to every disorder in which there is pain at the outer side of the elbow

caused by energetic use of the arm. It resembles the term 'low back pain' in that its use precludes any attempt to understand the pathology of the several lesions included."

On the fly leaf of the book it is stated that "the textbook is written primarily for the undergraduate student and the postgraduate who is beginning his surgical training." This is an understatement for the book should not only be valuable to these groups but to the general practitioner and other specialists who are in need of an up-to-date authoritative and concise work on orthopedics.

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AESCULAPIUS COMES TO THE COLONIES. The Story of the Early Days of Medicine in the Thirteen Original Colonies. By *Maurice Baer Gordon*, M.D. First edition. Fabrikoid. Price, $10.00. Pp. 560, with illustrations. Ventnor Publishers, Inc., Ventnor, N. J., 1949.

This splendid work is concerned with the story of the early days of medicine in America. In these days of modern medicine with its rapid scientific development of the past few decades it is difficult as the author points out to realize that medicine in America was not born with a silver spoon in its mouth.

The author found it a difficult task properly to evaluate the available source material. Writers praised their medical friends and denounced their medical enemies. The colonial newspapers advertisements and articles promoted this or condemned that. Thus it has been a task of no mean order to sift out the false from the true and to eliminate pure propaganda.

The writer has tried to reproduce a fair cross section of the status of medical practice in colonial America in the thirteen Original States. While other volumes have dealt more or less completely with such colonies as Virginia, Massachusetts, Pennsylvania and New Jersey; others such as Georgia, the Carolinas, Delaware, New Hampshire and Rhode Island have scarcely been touched. This, then, is the first attempt to present a more or less balanced picture of doctors and medicine in all the original colonial states.

Gordon gives a vivid and interesting account of the early training of the physician and his place in society. The influence of the American Indian on medical practice is ably presented. The Indians made contributions to the practice of medicine, such as the sweat house, and, Gordon states, the American Indians handled their wounds, empyemas, fractures and dislocations as well as, if not better than the eighteenth century white physicians. The Indians definitely added 59 drugs to our modern pharmacopia.

There is a general historical survey at the beginning of each chapter to orient the reader sufficiently to place the time and the locale of the medical events that follow.

Benjamin Rush, who is considered by many authorities to have been the greatest early American physician, did no single thing that warrants listing in the compilation of major events in the early history of medicine in America, according to Gordon. Undoubtedly many will violently disagree with this evaluation.

This is a book that is well written and makes fascinating reading. It is worthy of the Gordon tradition. It is a scholarly work and the vigorous personality of the author — the son of the scholarly Dr. Benjamin Lee Gordon—is evident throughout the entire work. It is all the more remarkable when one considers that the author wrote this history during the busiest period of his professional career.

It is to be hoped that this book is given wide acceptance for the reader will find not only relaxation in its pages but also a better understanding of medicine as we know it today. This volume should be in every physician's library. It is highly recommended.

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MEDICINE THROUGHOUT ANTIQUITY. By *Benjamin Lee Gordon*, M.D., Member American Association of the History of Medicine and American Academy of Ophthalmology and Otolaryngology, Certified by American Board of Ophthalmology, Attending Ophthalmologist to Shore Memorial Hospital, Somers Point, New Jersey, and to Atlantic County Hospital for Tuberculous Diseases and Atlantic County Hospital for Mental Diseases, Northfield, N. J., Authorized Medical Examiner for Civil Aeronautics Administration, Department of Commerce, Washington, D. C. Author of "The Romance of Medicine." With a foreword by Dr. *Max Neuburger*. First edition. Fabrikoid. Price, $6.00. Pp. 818, with 157 illustrations. F. A. Davis Company, 1914-16 Cherry St., Philadelphia 3, 1949.

Medicine Throughout Antiquity should be required reading for every medical student — not alone for its cultural value — but so that he might gain a better appreciation of modern medicine. Oliver Wendell Holmes, urged his students not to look with contempt on ancient and outmoded medical books; he says, "That debris of broken systems and exploded dogmas forms a great mound, a mountain Testaccio of the shards and remnants of all vessels which once held human beliefs. If you take the trouble to climb to the top of it you will widen the horizon and in these days of specialized knowledge your horizon is not likely to be too wide."

It was the aim of the author to survey the medical history of antiquity, to bring together facts scattered in large and varied fields of literature which are not ordinarily accessible to the average busy practitioner. This the author has accomplished in a clear concise discriminating scholarly manner.

The book is divided into two parts. Part one deals with prehistoric and photohistoric medicine comprising fourteen chapters. Part two is confined to the Greco-Roman period with two chapters devoted to Talmudic medicine.

Gordon divides medicine of antiquity into three unequal periods. The first, or long period, began with the birth of man and terminated when his-

tory began to be recorded. Information for this period has been garnered from paleopathologists, from evidence of disease discovered in fossilized human remains, from rude paintings and carvings on walls of caves and stones, and from stone instruments which may have been used for surgical operations. The second period began with the first recordings of history and persisted until the rise of the philosophical school of Ionia. These records are not confined to medicine and surgery, but deal with general matters, with medicine or surgery incidentally referred to. The third or rational period began with the Ionian philosophers and terminated with the decline and fall of Rome. From the start of this period, medical history has been committed to writing. Greece and Rome supplied most of the scientific medical information during this period. The philosophical speculations of Pythagoras, Empedocles, Alcamreon, and others of the Ionian school culminated in the "natural" investigations of Hippocrates and his school, which in turn transmitted its heritage to the students of the school of Alexandria and their Roman successors.

This volume deserves to be widely read for it is a fascinating story, well documented, and easily read. Gordon sums up the importance of history in a quotation from Cicero, who says, "Not to know what has been transacted in former times is to continue always a child; if no use is made of the labors of the first ages, the world must remain always in the infancy of knowledge."

This volume is very highly recommended.

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NEW AND NONOFFICIAL REMEDIES, 1950, CONTAINING DESCRIPTIONS OF THE ARTICLES WHICH STAND ACCEPTED BY THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION ON JANUARY 1, 1950. Issued Under the Direction and Supervision of the Council on Pharmacy and Chemistry of the American Medical Association. Cloth. Price, $3.00. Pp. 800. J. B. Lippincott Company, East Washington Square, 1950.

The present edition of this valuable reference book appears in a new and attractive guise, but the contents are much the same as those in the earlier editions. Gone are the familiar green binding and the violent red binding of a couple of editions during the war years, and in their place is a conservative blue cover, new type faces have been selected which are more legible and which make the pages look less like a typographer's nightmare than those of some previous volumes.

A somewhat limited use of the book has not as yet disclosed any of the errors in indexing that have marred so many of the recent editions of N. N. R., but the index still remains the worst feature. If some of the needless repetitions were omitted (a prize exhibit is the wasting of more than a page in listing the various accepted brands of penicillin, all of which are easily found in the text by consulting the article on penicillin), there would be enough space to include some valuable information that is now lacking — e. g., the chemical names of the products. The Council on Pharmacy and Chemistry has an able editorial staff, and the editorial department of the American Medical Association has a large staff of trained indexers; why, then, are they not permitted to make the index? The services of a competent medical indexer would make this a much more valuable reference work than it has been recently.

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POCKET ENCYCLOPEDIA OF ATOMIC ENERGY. Edited by *Frank Gaynor*. Cloth. Price, $7.50. Pp. 204. Philosophical Library, Inc., Publishers, 15 East 40th Street, New York 16, 1950.

This interesting book is replete with accurate, detailed information, in alphabetical order, on the whole strange and wonderful vocabulary of atomic energy from abmho to ZEEP. The definitions are formally correct yet readable, being supplemented with relevant technical information, often in the form of illustrations and tables, together with a judicious amount of historical and biographical material. The author has wisely decided that the reader is better served by definiteness and explicitness than by vagueness and omissions. The large isotope table (pp. 82 to 102) should prove especially valuable for reference. Diligent search of the book for errors discloses one misprint at the bottom of p. 169, where one might complain further of a lack of clarity in bringing out the contrast between "rem" and "rep." This book deserves a place in every library used by readers, medical or not, trying to keep oriented in the modern literature on nuclear physics.

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OFFICE TREATMENT OF NOSE, THROAT AND EAR. New 3rd Edition. By *Abraham P. Hollender*, Professor of Otolaryngology, University of Illinois College of Medicine. Cloth. Price, $7.50. Pp. 615, illustrated. Year Book Publishers, Inc., 200 E. Illinois Street, Chicago 11, Ill., 1950.

This third edition appearing only four years after the second edition, demonstrates the rapid advancements that are being made in this specialty. The changes in therapy and technic also show that more and more of the work in otolaryngology is now being done in the office rather than in the hospital.

This new edition has been revised to include the very latest developments. Throughout the book corrections and deletions of material from the older editions have been made and new information on procedures and drugs have been added. A new chapter on Psychosomatic Approach to Otolaryngology is contributed by the author's son, Dr. Marc H. Hollender of the Psychiatric Staff of the University of Illinois College of Medicine. The chapter on Physical Therapeutic procedures has been brought up-to-date through the help and suggestions of Dr. Disraeli Kobak.

The book is practical and well written and should be of value not only to the specialist in

this field but to the general practitioner who is frequently confronted with the care of these organs.

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RESEARCH IN MEDICAL SCIENCE. Edited by *David E. Green*, Ph.D., Institute for Enzyme Research, University of Wisconsin, Madison, Wisconsin, and *W. Eugene Knox*, M.D., Molteno Institute, University of Cambridge, England. Cloth. Price, $6.50. Pp. 492. The Macmillan Company, 60 Fifth Avenue, New York 11, 1950.

Twenty-six essays make up this volume. Each chapter is written by an authority and include such titles as Bacteriophages and Their Action on Host Cells, the Methodology of Medical Genetics, Microorganisms and Vitamin Research, Plasma Proteins in the Investigation of Disease Mechanisms, Rheumatic Fever, Viruses, the Direction of Surgical Effort, Immunochemistry and others. Each essay is a stimualting account of the developments and achievements in the particular subject and how this work has been accomplished.

This is the type of book that appeals to those physicians and scientists who wish to keep abreast of the progress in the biological sciences and basic sciences. Each subject is not exhaustively covered, however, sufficient factual information is included to give a satisfactory comprehension and a better understanding of these numerous and diversified subjects in the medical sciences. It is not always the easiest reading and the book probably will never be tremendously popular; however, the more intellectual will appreciate the publication of a volume that gives a great deal of information on the varied aspects of human-medical problems; not the least of the benefits to be derived by reading these many chapters is the realization of the way in which biology, chemistry and physics are correlated and integrated.

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KLINISCHES LEHRBUCH DER PHYSIKALISCHEN THERAPIE (CLINICAL TEXTBOOK OF PHYSICAL THERAPY). Contributors: Prof. Dr. G. Boehm, Munich; Prof. Dr. Cobet, Halle A.S.; Prof. Dr. J. Grober, Jena; Prof. Dr. P. Happel, Hamburg; Prof. Dr. A. Reisner, Stuttgart; Dr. U. Schneider, Munich. Edited by Dr. *J. Grober*, Professor of Internal Medicine, Director of the Physical Therapy Institute of the University of Jena. Second edition, improved with 204 illustrations. Cloth. Pp. 378. Price, 18 DM. Gustav Fischer, Jena, 1950.

The second edition of the textbook of the well known German leader appears after an interval of sixteen years with evidences of the considerable difficulties that had to be overcome. In the introductory chapter on the nature and problems of physical therapy, Grober speaks among other things on physical therapy of the well, gymnastic exercise, on the importance of physical therapy in functional diagnosis; he points out that physical therapy and pharmacotherapy are of equal importance, but the employment of physical energies should appeal to the younger generation of physicians. The first chapter, also by Grober, deals with massage; he raises the question of quantitative measurement of the energy expended and he emphasizes the importance of massage by and for the physician. A short section on ultrasound therapy is attached to this chapter as a passage from mechano- to electro- and thermotherapy. In the conception of its effects, Grober is conservative and does not recognize any specific effects. The subsequent two chapters are by Boehm and Schneider on therapeutic exercise and on pneumotherapy (respiratory gymnastics and apparatus, pneumatic chambers with increased and decreased pressure, endo-pneumotherapy) by Grober. There is a chapter of only 46 pages on light therapy by Grober and of 27 pages on radium emanation therapy by Happel. Hydro- and thermotherapy are presented on 65 pages by Grober, balneotherapy on 26 pages by Boehm and finally Climatotherapy on 31 pages by Grober. Evidences of the fact that this textbook appears from behind the Iron Curtain are the poor grade paper as compared with the first edition the lack of any international references and the large number of illustrations of obsolete apparatus and technics. Its clinical material and its wide scope make it still a worthwhile volume.

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THE NUTRITIONAL IMPROVEMENT OF LIFE. By *Henry C. Sherman*, Mitchill Professor Emeritus of Chemistry, Columbia University. Cloth. Price, $3.75. Pp. 270 with 13 tables. Columbia University Press, New York, 1950.

Sherman and nutrition are almost synonomous. The contributions of Sherman to the science of nutrition have shown us the way to live fuller, more effective, happier and longer lives. This, his latest book, has been written, he states, chiefly for the reason that now our knowledge of nutrition has reached a stage in which it reveals much more than was foreseen. This book completes a group of three small volumes which was begun with the Science of Nutrition and continued in Foods; Their Values and Management. This book is a sort of capstone to both of these, dealing essentially with the human implications of the new knowledge.

The author points out that we have good scientific evidence that nutritional improvement of life can begin before birth or at practically any time after, that in early life it can mean improvement of mental as well as physical growth and development. Much of what was thought to be attributable to heredity or fate we now find amenable to nutritional improvement. We now know then that both heredity and nutrition are major factors in determining the length of normal lives.

The first half of the book follows in a chronological sequence the growth of nutrition throughout the half-century of its recognition as an autonomous science. The latter half of the book discusses topics of most recent development and their implications for the improvement of life in all its aspects. There is an appendix summarizing current developments in the United Nations Food and Agriculture Organization. A second appendix gives records of actual meals to illustrate how

the guidance of the nutritional principles given in this book have worked out in the daily lives of people. An excellent bibliography is also appended. The various chapter headings are as follows: nutrition as public concern and as individual adventure; nutrition in the nineties; beginnings of permanently organized research in nutrition; first decade of the twentieth century science of nutrition; nutrition in the decade of 1911-1920; advances during 1921-1930 and the concept of nutritional improvement; nutrition in the decade of 1931-1940; in the second World War; principles and practice; the internal environment and the quality of life; improved nutrition and length of life; further human implications; and better nutritional status for more people.

This is a fascinating story of nutrition written without requiring the reader to endure any long technical details of research. It deals less with how the advances of yesterday were made, and more with what they can mean for today and tomorrow. The text is well, and hence simply written. The book should be read by all physicians, dietetians, nurses and physical therapists. It is moreover, a book that could be profitably read by any intelligent layman.

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VITAMINS AND HORMONES: ADVANCES IN RESEARCH AND APPLICATIONS. Volume VII. Edited by *Robert S. Harris*, Professor of Biochemistry of Nutrition, Massachusetts Institute of Technology, Cambridge, Mass., and *Kenneth V. Thimann*, Professor of Plant Physiology, Harvard University, Cambridge, Mass. Cloth. Price, $7.80. Pp. 488, with illustrations. Academic Press, Inc., Publishers, 125 E. 23rd St., New York 10, 1949.

This volume is of particular value for investigators concerned with the biochemistry of vitamins and hormones. Careful reviews of recent work with pertinent references are collected here covering the subjects of Vitamin P, Stereoisomeric Provitamins A, thiamine, niacin, chemistry and physiology of anterior and posterior pituitary hormones, and the dietary requirements of rats and guinea pigs. Although primarily written for those doing fundamental laboratory research, the clinician will find this a valuable reference book. Of special interest to those in the field of physical medicine are the chapters on Diet and Aging and Infrared Spectrometry.

DICTIONARY OF GENETICS. Including Terms Used in Cytology, Animal Breeding and Evolution. Compiled by *R. L. Knight*, D.Sc., Ph.D., A.I.C.T.A. Senior Economic Geneticist, Empire Cotton Growing Corporation and Sudan Government. Fabrikoid. Price, $4.50. Pp. 183. Chronica Botanica Co., Waltham 54, Mass.; Stechert-Hafner, Inc., 31 East 10th St., New York 3, N. Y., 1948.

The main portion of this book consists of 162 pages of brief definitions of terms used in the literature of genetics. Since the definitions are given without most of the information about etymology, pronunciation and other details that one expects of a dictionary, the book should perhaps be called, rather, a glossary or vocabulary; as it is, one feels inclined to forget how much the author has done and to wish he had done more. Pages 165 to 183 contain mathematical formulas and tables to facilitate the geneticist's calculations, a bibliography, and a collection of rules drawn up at the International Congress of Genetics in 1932 for symbolizing genes and chromosome aberrations. The book will be useful to those engaged in research and writing in this special field of biology, and the author is to be commended for this constructive effort to halt the "present trend towards complication of vocabulary."

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ELECTRONICS: EXPERIMENTAL TECHNIQUES. By *William C. Elmore*, Associate Professor of Physics, Swarthmore College and *Matthew L. Sands*, Assistant Professor of Physics, Massachusetts Institute of Technology. First edition. Fabrikoid. Price, $3.75. Pp. 417 with illustrations. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 18, 1949.

This volume is one of the National Nuclear Energy Series on the principles and construction of electronic circuits for use with experimental testing in atomic energy research.

It deals with the voltage and power amplifying circuits, electronic counters, oscillographs and other testing equipment. It is profusely illustrated with diagrams of circuits. The mathematical treatment is not difficult.

This book is primarily for those who are interested in atomic energy research or research in which electrical circuits are used. It probably would be of little value to a general practitioner of medicine. Those physicians who are interested in the fundamentals of diathermy circuits and other electrical appliances would find this a valuable addition to their library.

# PHYSICAL MEDICINE ABSTRACTS

**Rehabilitation of Common Neuromuscular Disorders. George Morris Piersol.**

Postgraduate Med. **8**:38 (July) 1950.

The purpose of this clinic is to demonstrate what a carefully integrated and patiently carried out rehabilitation program can do for individuals who by reason of injury or disease have been so badly crippled that without further aid they would become complete charges on the community and individuals with discouraging futures.

The first problem in the rehabilitation of these individuals was to get them to navigate, so they could move around. A person who is down, unable to stand, balance, or get from place to place is under a tremendous disadvantage.

The attention of those who care for these people cannot be directed merely toward their lower extremities, or any single part that is involved; the whole patient has to be considered. Efforts have to be made to build up their remaining good musculature to the point where it is able to carry a much greater load than normally it would be required to do.

It has been shown that individuals with appliances, in making ordinary effort such as getting out of a wheelchair, will expend energy many hundreds of times greater than that which a normal person requires to perform the same act.

The primary purpose is to get people back to a point where they can do the maximum amount and take as much care of themselves as possible. In order to do that one must be prepared to abandon preconceived notions and be governed chiefly by practical considerations.

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**Rehabilitation in Small Communities. Shelby Gamble.**

Ohio State M. J. **45**:893 (Sept.) 1949.

Rehabilitation, medically speaking, is a word that has great variance of meaning. Depending on the degree of handicap present, it may range from a maximum of complete restoration to a minimum of enabling the individual to be partially independent so far as his daily needs are concerned. Even the attainment of self-sufficiency in toilet habits may help surprisingly in the economic problems of the patient's family, thus freeing another member of that family for gainful employment and eliminating or reducing the need for financial assistance with its resultant drain on family or community.

In small communities, this over-all plan should start at the local hospital, making use of a department of physical therapy. Although the department may be small and initially requires only the part-time services of a physical therapist, a great deal could be done in preventing deformity, preserving and restoring muscle and joint motion, aiding in ambulation and maintaining the best possible general condition of the patient.

The next step in further development on a local hospital plan would be a department of occupational therapy. Occupational therapy may be used by itself or as a supplement to physical therapy, as it is a treatment based on activities. A definite program may be provided in which some mental or physical activity is scientifically supervised by trained therapists for a specific purpose. Occupational therapy may be indicated for improving or maintaining morale; it may be entirely diversional, educational or recreational, or functional in the sense of restoring articular and muscular coordination, building up strength and physical endurance; it may be prevocational in the sense of being planned to reinstate the patient in his former job or to prepare him for new vocational training.

No one can outline a definite program that will fit all communities; this is an individual problem for each concerned.

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**Nonsurgical Orthopaedic Management of Rheumatoid Arthritis. Daniel E. Kavanaugh.**

J. M. Soc. New Jersey **46**:421 (Sept.) 1949.

The treatment of muscle atrophy and muscle incoordination begins when the orthopedist first sees the patient, if it has not already been instituted. To preserve or restore muscle power in the upper and lower extremities, it is necessary to establish a definite muscle training program, supervised by the doctor, in which the patient and the physical therapy department participate. The patient's participation is probably the more important. It is important that the patient develop the habit of voluntary exercise of all joints as much as possible every day. He remains diligent in carrying out these exercises not only throughout his convalescence but after he has become successfully ambulatory. With a proper muscle training program a number of our patients, confined to bed for a few months or more, have had sufficient muscle power to require no support of the knees when they have reached the ambulatory stage.

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**The General Practitioner Looks at the Feet. Edwin Matlin.**

Am. Practitioner **1**:172 (Feb.) 1950.

One of the most common complaints to be found in all walks of life is that of painful feet. It has been estimated that 80 per cent of the population has at one time or another been bothered with "foot trouble," and yet only a handful are treated in a general practitioner's office. The explanation

ts that they are referred by the family physician, or by a friend, to podiatrists, chiropodists and sometimes to unscrupulous persons.

It is a fact that when interest is lost in any part of the practice of medicine there arises a group of people, who may be legitimate, or cultists, or unscrupulous persons, who are only too happy to take over a lucrative field. When the physician generally evinces an interest in heretofore largely ignored phases of medicine, then these offshoots disappear, as the midwife disappeared when the physician took over the practice of obstetrics.

The practitioner's lack of interest in foot care springs directly from his lack of knowledge. In medical school, little or no attention is given to the treatment or diagnosis of foot ailments, and it has always been much easier to refer a patient to a minor "specialist" than to play around with "someone's dirty smelly feet."

Rest and short wave diathermy treatment may be combined, the first to avoid unnecessary trauma, and the second to increase circulation to carry off the toxins produced by destruction of tissue following trauma. They are indicated in acute conditions, after the first twenty-four to thirty-six hours. In acute conditions strappings or the application of heat and cold are contraindicated. The trauma causes edema due to the rupture of small blood vessels. Strapping at this time may interfere with the circulation as the swelling progresses, and the application of either heat or cold by increasing the circulation and causing a vasodilatation will increase the swelling and bleeding also.

The general practitioner has failed to render the service a patient justly deserves and expects to receive, when he overlooks or is disinterested in the patient's feet. A few of the more common difficulties are described, and methods of treatment are outlined. An awakening of interest on the part of the general practitioner will result in a more adequately cared-for patient.

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**The Hospital and the Practice of Medicine. Arthur C. Bachmeyer.**

Hosp. Prog. **31**:52 (Feb.) 1950.

Without physicians there can be no hospitals. Without physicians there can be no competent medical service. The hospital was not an important institution 100 years ago. In fact, in those days it was the source of great apprehension and even dread for those whose misfortunes brought them to its doors. It was regarded largely as a terminal station in life. While it remains true that a large majority of the conditions for which people consult their physicians can be cared for in the office, clinic, or home, the hospital is the sole agency in which all resources for the care and proper treatment of the serious illness are available. These resources are marshalled at a moment's notice by the physician's request or instruction for the benefit of his patient.

The medical profession recognizes the need for and value of hospital services. It realizes that the well organized and administered hospital makes it possible to render adequate and competent professional service. However, the best of equipment and skilled personnel do not guarantee a high quality of medical care. For this the physician, alone and collectively, through the organized staff of the hospital must be primarily responsible.

Certain other medical specialists, such as in anesthesiology, physical medicine, radiology and pathology, in large measure, limit their professional service to the hospital. Their patients are referred to them or the services they perform are requested by their colleagues on the hospital staff. Their practice differs in form from that of most other physicians. In effect, they are given a monopoly of their services in the hospital. The financial arrangements under which they serve the institution vary widely. These financial relationships often have been the subject of sharp controversies between hospital authorities and these specialists. The basic principles enunciated some years ago by hospital and medical associations continue to be sound and fair, namely, that regardless of the particular scheme of compensation adopted, neither patient, specialist, nor hospital should be exploited. This, it would appear, is a sound principle to follow in all cases in which physicians are compensated by hospitals or related institutions.

It is important to bear in mind that nothing should be permitted to intervene between the physician and his control of his professional service. No authority, hospital or otherwise, can direct the physician's professional service. Hospitals do not and cannot practice medicine. This must remain in the prerogative of the physician. Collectively, physicians can and should police their profession. They are responsible through their organized efforts for the maintenance of the highest quality of medical service that it is possible to render the public.

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**Strokes — Their Evaluation and Treatment. Abe B. Baker.**

J. Iowa M. Soc. **40**:107 (March) 1950.

The term stroke has, over a period of time, become associated with two concepts, one, clinical, and one, pathologic. Clinically, it has become restricted to the acute onset of motor manifestations such as weakness or paralysis; pathologically, it has been limited to lesions resulting almost exclusively from a cerebrovascular accident. Actually both of these inferences are for the most part incorrect. It might be best to first consider the clinical implications of a so-called stroke.

The term stroke as it is used today indicates some focal symptom of brain dysfunction. If such an assumption is correct, then the manifestations of the stroke will be as varied as the accepted function of the brain itself. The physician generally is not concerned with the more finite disturbances of brain function and may well avoid such disturbances in a routine diagnosis.

The immediate care of the stroke patient consists of general medical treatment and good nursing care. Medical procedures and therapy for the underlying disease is begun immediately upon arrival at the hospital. Nursing care of these patients is of the utmost importance in order to (1) prevent contractures (by passive movements of the extremities through a full range of movement), (2) avoid hypostatic pneumonia (by frequent change of patient's position, removal of nasal and oral secretions), (3) prevent decubital ulcers (by close attention to skin hygiene), (4) institute a schedule for eating, bowel habits, waking and sleeping as the patient begins to improve. The nurse because of early contact with the patient, encouraging him to help himself, is the first step in rehabilitation.

Most stroke patients, depending upon the severity and cause of the involvement, are kept in bed from three to six weeks. As soon as the acute symptoms have subsided and while the patient is still bedridden, physical therapy should be instituted to prevent deformities by the use of passive movement. Between therapy periods, footboards, sandbags and splints may be used to maintain proper position of the limbs. As the patient improves, he is encouraged to use the affected extremity as much as possible and to care for his own bedside needs. Heat, massage and hydrotherapy may be used for painful joints and extremities.

Ambulation is started when the patient is strong enough to bear weight on the affected limb. He usually is started by balancing within parallel bars and progresses through the normal stages of ambulation, namely, crutch gaits, cane gaits and, when possible, walking without aids. Special attention should be given to stair climbing.

Speech therapy often is helpful in patients with speech disturbances and should be instituted early. Because of their disability, many of these patients may have to learn new vocations.

This process of rehabilitation of the stroke patient is an important part of the total treatment program and must be instituted in every case. It generally can be carried out, even in the home, provided that the physician understands his goal, is sympathetic toward it and is willing to spend a little time with the family and the patient in outlining and directing the course of therapy. Members of the family can be taught to carry out passive movement in appropriate cases. Self-care and ambulation activities, particularly in milder cases, may not need a trained therapist and can be carried on by the family under the supervision of the physician.

The outlook for functional recovery naturally is variable from patient to patient and can be determined only by careful neurologic evaluation from time to time. All patients with a hemiplegia, however, regardless of the degree of recovery, are capable of ambulation if given adequate rehabilitation therapy.

**The Mechanism of the Structural Changes in Scoliosis. Alvin M. Arkin.**

J. Bone & Joint Surg. **31-A**:519 (July) 1949.

It has been shown how a functional, nonwedged curve can progress into a fixed structural scoliosis. Although a discussion of the etiology of the preceding functional curve is not within the scope of this paper, it may be assumed that the initiating cause of the functional curve, in some cases at least, may continue to contribute to the structural scoliosis which follows. Whatever the cause of the functional curve, as soon as it has produced a deviation exceeding a certain critical value, the factors described in this paper come into play and the spine has embarked on the course of epiphyseal compression and structural scoliosis. It is possible that such factors as rapidity of growth, heredity, and sex, and pathological processes, such as rickets, may modify the quantitative relationship between pressure and growth arrest. Obviously the best treatment is prevention, by correcting postural deviations, whether in the anteroposterior or the lateral plane, or both, before they progress to structural changes. In a severe curve, plaster jackets and braces cannot completely relieve the epiphysis of the pressure induced by the superincumbent weight, tremendously multiplied as it is by the mechanical arrangement which obtains. Recumbency, of course, removes the superincumbent weight completely. A combination of these two methods (jackets plus recumbency) would seem to offer the better prospect of successful conservative treatment. The vertebral deformation of structural scoliosis can be explained by an asymmetrical disturbance of epiphyseal growth by pressure. "Vertebral epiphysitis" is a related lesion.

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**Prevention and Treatment of Deformities in Rheumatoid Arthritis. Donald F. Hill, and W. Paul Holbrook.**

J. A. M. A. **142**:718 (March 11) 1950.

The most important treatment in rheumatoid arthritis today is prevention of deformity and the maintenance of function.

First in treatment is use by the patient of correct rest measures and avoidance of strain to joints. The proper bed is flat, with boards under the mattress to prevent sagging, so that the patient may rest in correct posture with the joints extended.

In ambulatory patients proper shoes and supports are indicated, with low, broad, rubber heels, metatarsal bars and pads.

Second most important treatment is proper corrective exercise. Because of atrophy and weakened muscles, the patient must take exercise in small doses, frequently and gradually increased on a prescribed schedule. To gain cooperation the physician must explain the reasons for exercise: (1) to increase and maintain joint motion; (2) to strengthen the muscles for joint support, and (3) to increase circulation. The patient must be given

a specified amount or number of exercises to do, and directions for increasing them on a definite schedule. He should receive a full list, including all muscle groups, with instructions by the physical therapist or physician.

Tolerance must be explained to the patient, so that he will not stop as soon as exercise "hurts." It is a good rule that pain during exercise does not matter, provided the pain does not persist hours afterward or the same exercise is not more painful the next day.

Correction of deformity is a much more difficult problem than prevention of it, and requires special training and care. With proper attention to the preventive measures, most of the deformities we see today could have been prevented.

Proper standing exercise and walking exercise should be supervised. Proper posture and gait is important and must be emphasized. Except for the exceedingly hot or acutely inflamed joint, manipulation does not need to be postponed until the active arthritic process subsides.

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**Prediction of Unequal Growth of the Lower Extremities in Anterior Poliomyelitis. Allan J. Stinchfield; John A. Reidy, and Joseph S. Barr.**

J. Bone & Joint Surg. **31-A**:478 (July) 1949.

Of 166 adults in whom poliomyelitis developed before the age of eleven, varying degrees of muscle power and shortening were present in the lower extremities. There was no specific relationship between the age of onset and the amount of discrepancy in limb length. There was, however, a definite relationship between the relative muscle strength in the two extremities and the discrepancy in limb length. These data may be utilized clinically in predicting the amount of shortening that will occur in a patient having poliomyelitis before the age of eleven.

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**Tendon Grafts in the Hand. Carruth J. Wagner.**

Mil. Surgeon **105**:196 (Sept.) 1949.

Postoperative care is very simple. The original dressing is not disturbed for a full three weeks, and during this time the arm is elevated to prevent edema and hematoma formation. At the end of this time the dressing is removed and all sutures, including the pullout wire, are removed. A simple plaster splint is then applied to prevent extension of the finger and to allow flexion and the wrist is released. Active flexion exercises are then instituted and after a week all immobilization is discarded and the exercise intensified. An exercise board is introduced and active splinting utilized if any joint stiffness has occurred during immobilization.

Tendon grafts in the treatment of unrepaired lacerated flexor tendons in the hand will yield uniformly good results if principles of the indications, functional results to be expected and surgical technic as devised by Bunnell are strictly followed.

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**Postural Changes in the Circulation of Surgical Patients as Studied by a New Method for Recording the Arterial Blood Pressure and Pressure Pulse. Lysle H. Peterson; Kenneth F. Eather, and Robert D. Dripps.**

Ann. Surg. **131**:23 (Jan.) 1950.

Many analyses have been made of the circulatory response of man to the assumption of the erect position. The changes in cardiac output, arterial blood pressure and pulse rate which occur have been recorded in normal individuals and in patients under a variety of conditions. The capacity of the legs to hold blood is unquestionably established. The effects of postural changes on the circulation have not received the attention they deserve in routine surgical practice. It is the hope of the authors to illustrate certain circulatory alterations, beneficial as well as detrimental, which they have noted in patients moved into and out of the various positions, and to emphasize again the implications inherent in these changes.

With a new method of recording intra-arterial pressure and pressure pulse waves they were able to observe a number of postural changes in the circulation which are of practical significance to the surgical patient. Marked hypotension may follow return of the patient from the lithotomy to the horizontal position. Yet paradoxically this pooling of blood in the lower extremities which under the circumstances just noted, is so harmful, may be turned to the patient's advantage. Thus, in conditions of low blood pressure primarily caused by vasodilation, elevation of the legs, autotransfusion, may be of great help.

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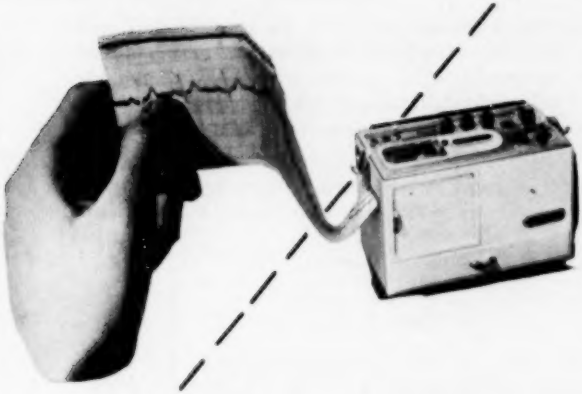

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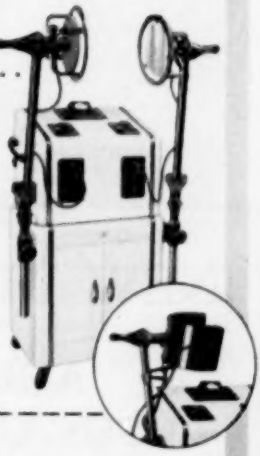

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| Veterans Admin. Hospital [1] | Cleveland | H. T. Zankel | 2,452 | 105,000 | 2 | 7/1 | n |
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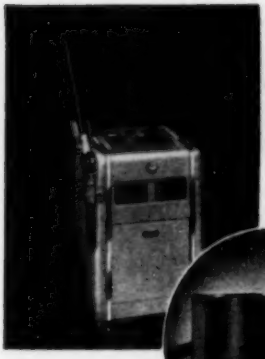

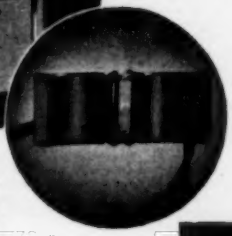

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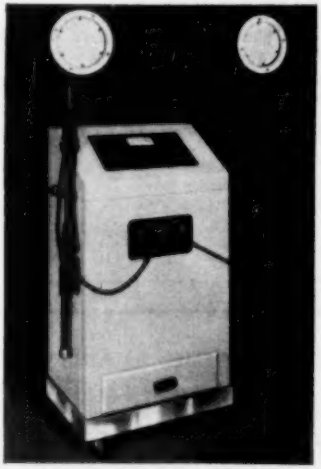

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For further information, please write Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

# Section on Physical Medicine and Rehabilitation

# Southern Medical Association

**St. Louis, Missouri**

## Wednesday, November 15, 1950, 2:00 to 5:00 p. m.

1. **The Use of Heat in General Practice.**
   WALTER J. LEE, M.D., Richmond, Virginia.

2. **A Report on Three Years' Activities in the Veterans Administration TB Center.**
   BATHHURST B. BAGBY, M.D., Chief, Physical Medicine Rehabilitation Service, Veterans Administration Hospital, Oteen, N. C. (Asheville).
   Discussion: A. Ray Dawson, M.D., Richmond, Va.

3. **Physical Treatment in Internal Medicine.**
   SEDGWICK MEAD, M.D., Assistant Professor of Physical Medicine and Head of Division of Physical Medicine, Washington University School of Medicine, St. Louis, Missouri.
   Discussion: Emmett M. Smith, M.D., Washington, D. C.

Intermission

4. **Conservative Management of the Painful Shoulder.**
   DONALD L. ROSE, M.D., Associate Professor of Physical Medicine, University of Kansas School of Medicine, Kansas City, Kansas.

5. **Guillain-Barre Syndrome.**
   ODON F. VON WERSSOWETZ, M.D., Chief, Physical Medicine Rehabilitation Service, Thayer Veterans Administration Hospital, Nashville, Tenn.
   Discussion: Leland B. Alford, M.D., St. Louis.

6. **Title to be announced.**
   ALVIN B. C. KNUDSON, M.D., Chief, Physical Medicine Rehabilitation Division, Department of Medicine and Surgery, Veterans Administration, Washington, D. C.

Election of Officers

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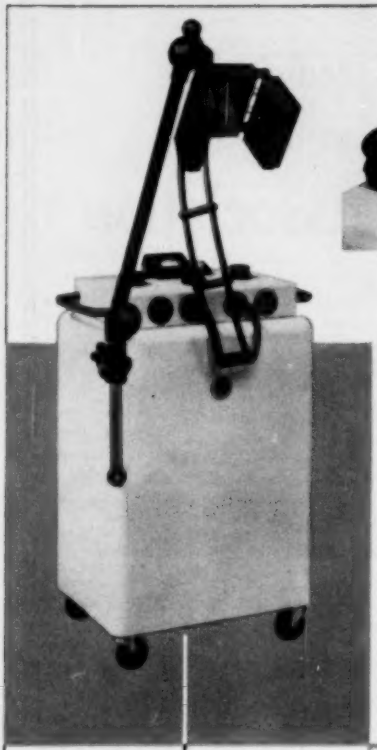

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